# Organic Gardening

JULY 1948
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# 6 ACE SUPER-COMPOST

# EARTHWORMS

## 6 ACE SUPER-COMPOST

***is 100% organic and has about four times the fertilizer value of barnyard manure.***

DID you ever stop to think that the only fertilizer used by Mother Nature was the decaying organic matter of animals and plants?

Up through the ages, over all the world, in every climate, for every soil and every kind of plant, Nature used but that one fertilizer—decaying organic matter of animals and plants. That is what 6 ACE is: an organic combination of animal and plant organic matters in sufficient numbers and right proportions to make a complete, universal plant food, soil food, and soil conditioner like Mother Nature used. And with which she built soils so good that we cannot duplicate them.

Mother Nature did not use a different fertilizer for the different soils and different plants. She used just one fertilizer—organic.

6 ACE is quick-acting—yet long lasting in the soil. It gives your grass and plants a quick start and keeps them growing. It feeds your earthworms, stimulates and feeds the soil bacteria, fungi, and other organisms. It softens hard soils, and gives body to sandy soils.

6 ACE may be used as a mulch, or worked into the ground. It may be put around your plants or beneath them. It may be spread on the lawn, or worked into the soil before the lawn is planted.

6 ACE is a super-compost, not just a compost. You can—and should—make compost, but it is not likely to equal 6 ACE SUPER-COMPOST.

## ABOUT EARTHWORMS

YOU will hear it said that if you put some 'humus' in your soil, earthworms will 'miraculously' appear. Yes, that is true, Some worms will appear. But it may take you years that way to get a worthwhile earthworm population in your soil. A quicker way is to plant earthworms along with those already in your soil.

We can supply earthworms. They are the small California variety that are easier to work among in your garden without hurting them. And their castings are so small that they improve instead of harm your lawn.

Some 6 ACE in your soil with your earthworms, to feed them, is the best way. 6 ACE and earthworms make a good combination in your lawn, flower and vegetable garden—and in your field if you have one.

**Write for Prices on 6 ACE SUPER-COMPOST and EARTHWORMS**

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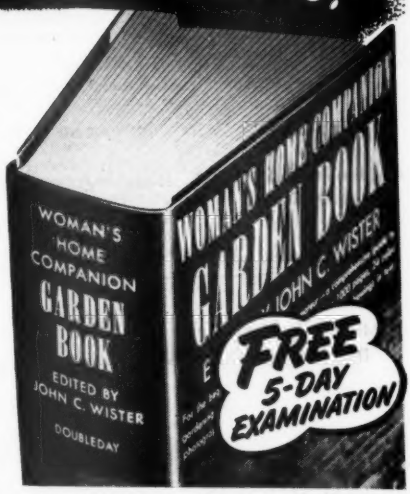


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Organic Gardening

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Every gardener wants pretty flowers, lush lawns, more healthful vegetables and fruit. Wise organic gardeners know that the best and easiest and cheapest way to better gardens is thru compost-fed soil . . . that garbage makes richest humus . . . that leaves alone are superior in fertilizer values to manure! But formerly it often required months or years to build rich soil. *Now*, with *ActivO*, you can convert choice compost into fertilizer in as short a time as 2 weeks! And WITHOUT ODOR!

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Another enthusiastically tells, almost unbelievingly, how he composts large quantities of manure, in a city backyard, without odor! Still another makes fertilizer in his basement, from **garbage.**

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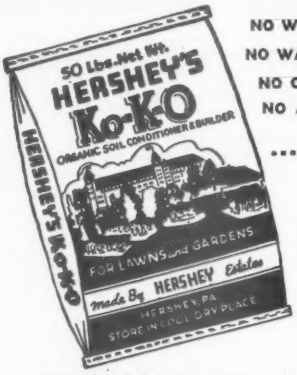


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NO WATER
NO ODOR
NO ACID

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# Ko-K-O

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## CRITICISM AND FREEDOM

February 20, 1948.

Gentlemen:

Five hundred thousand dollars was the gift of John Lee Pratt to Johns Hopkins University to study "trace elements." In the plants men eat, or the plants eaten by the animals which men eat, the chemists find subtle signs of certain chemicals. The quantity of these elements, as of copper, is so small it can hardy be measured. It is but a "trace." Without this "trace" of minerals, too small to measure, can men or animals thrive? There are signs that they cannot. If we let these unseen elements wash to the sea or be lost in sewage, what becomes of us?

Walter Locke,
c/o J. B. McCrary,
Atlanta, Ga.

—o—

## MASTER FARMER AMAZED BY COMPOST

February 23, 1948.

Dear Sirs:

The greater part of my 45 years of life was spent on a large farm. Until I learned about organic gardening a little over a year ago I thought I knew most everything about soils and their upbuilding by green and barnyard manures, lime, and generous applications of chemical fertilizers.

The use of composted manures seemed to me a laborious way of fertilizing field crops, even small garden areas, especially with the inferior, leached product of old-fashioned compost heaps that my father and grandfather turned out.

But not so with the product of the

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compost heaps made according to your directions. I know, because I have made several good ones, and used the resulting product at a high rate of application on my garden. Compost, scientifically made as organic gardening recommends, is really a very concentrated organic fertilizer that has everything the practical gardener desires in a plant food,—ready availability, yet lasting, non-burning, balance, soil loosening, etc.

I freely gave away all my left-over chemical fertilizer and purchased bone meal and raw ground phosphate rock. Hereafter I will keep my garden soil supplied with these, and a good supply of well-made and well-matured compost.

Last year my garden was really a mass of verdant growth—sunflowers 15 feet tall with heads 15 inches in diameter, butterbeans that far outtopped the poles and produced an abundance of tasty beans. But somehow the bean beetles never got the upperhand of these bean plants in this beetle-infested region. The tomatoes produced an abundance of tasty fruits and the blight bothered the vines not at all. The golden bantam hybrid sweet corn was the biggest success of all.

Your method of building up and maintaining soil fertility is so basically sound and correct that I often wonder why someone did not think of it sooner. It is so different from the ever-increasing, harsh and synthetic soil fertilizing practices of the present day. It is the old, centuries old, tried and proven method, with the magic touch of the present day scientific improvements added, to multiply its effectiveness over and over again. Man's ingenuity has only to devise the simple machines that will lighten the task of making and turning the compost heaps, and then the organic cultural methods can be practiced in the field as well as in the garden.

Paul E. Ptutschak,
Preston, Maryland.

## FRUITING PECANS

May 13, 1948.

Gentlemen:

I tried an experiment with my pecan tree which had previously not produced fruits. I put a 5-inch layer of weeds covered with 2 inches of fresh horse manure around the tree which is four years old and six feet tall. This year the tree has quite a few pecan fruits on it. I am giving the same treatment this year to my almonds and thin-shelled walnuts.

T. R. Callender,
R. D., Box 39,
Fort Worth, Texas.

(Editor's Note. It would be better if the weeds and manure were converted into compost before being applied to the trees. By omitting soil in the composting, some of the nitrogen is lost into the air as a volatile gas. Fresh manure is unbalanced and should never be used until it has been composted with plant residues and soil or has undergone a period of fermentation [rotting].)


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3 containers $2.50; ½ Gallon $6.00; 1 Gallon $11.00 Prepaid in U.S.A.

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BOX 748 DUNBAR, W. VA.

## OPENING SUNFLOWER SEEDS

May 18, 1948.

Gentlemen:

While I am writing you I should like to mention that I read a discussion in your book on sunflower seed as to how they might be opened other than with the teeth. I had a lot of the seed on hand that I had raised for birds and decided to try a few on myself. I thought I might be able to open them with pliers, and found that I could do so easily by placing the seed with the long thin sides between the parts at the end of the pliers that fit closely together and bringing those parts together on the seed toward its sharp end. By opening a dozen or so at a time the job is not at all tedious.

Miss Anne Burroughs,
Route 1,
Waynesville, N. C.

—o—

## WHO STOLE THAT COMPOST?

May 11, 1948.

Gentlemen:

I made my first compost in the spring of 1946, nursed it all summer and was very proud of my work and the results obtained but, when about ready to use it I discovered that some dirty thief had hauled it all away in a truck over night. Did I blow my top! I never was so mad and disappointed in my life. "Who steals my purse steals trash, but he who filches me of my good compost pile, robs me of that which *now* enriches him and leaves me poor indeed," to change a word in Shakespeare's famous lines, now for not.

H. P. Lambert,
Council Bluffs, Iowa.

—o—

## TOMATOES LIKE BUSHES

March 19, 1948.

Dear Sir:

Your *Organic Gardening Magazine* is a wonderful book. I have been farming my land for the past three years by your methods, and have had wonderful success in my garden.

My sunflowers were over 12 feet high and the flowers were immense. Also my tomatoes grew like bushes and the yield was terrific. I planted 300 plants, four feet apart each way but you just could not find a space to step between the fully grown plants. The plants were entirely healthy and the only trouble I had was with the tomato worm.

Betty Kovar,
P. O. Box 187,
Shelter Island Heights, L. I.

—o—

## COMPOST MAGIC TO FRUIT TREES

February 5, 1948.

Dear Sir:

I am not much of a writer, but I love to read and although I do not believe everything I read, I still give the writers the benefit of the doubt. No doubt most of us like to get the true facts about some statements made by certain writers. I have had personal experience with commercial fertilizers which I would like to share with others. In relating my experience I am only stating the bare facts without the frills. I had a small plot of ground in which I experimented several years before I learned about organic gardening. The soil was rather heavy clay and had lain fallow for quite a few years with a crop of weeds. Well, to make the story short, I plowed the plot and shortly afterward I planted things in season. I had read in the seed catalogs so much about commercial fertilizers, so I applied some according to the directions. It seemed to help the plants some the first year, but the following year was rather dry but in spite of repeated watering, the ground seemed to get hard as cement and some of the plants died. I quit using commercial fertilizer. In August of the second year I plowed under about 4 inches of lawn clippings and let them decompose in the ground during the winter. The following year I had quite an improvement in my garden. Still I was not satisfied. So I quit using this piece

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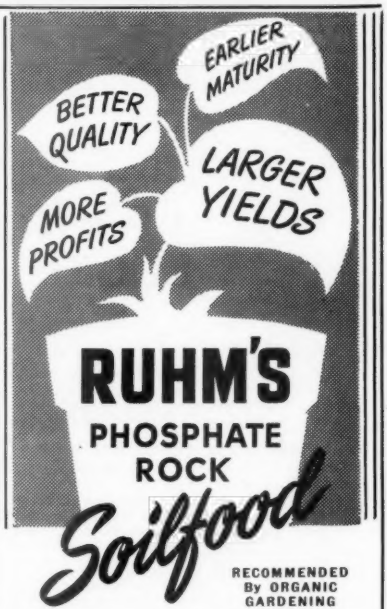


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of ground and bought about 1¼ acres lot and built a home on it. I plowed this piece of ground and planted quite a few trees and grapes and berries. Shortly thereafter, I got hold of a copy of the *Organic Gardening Magazine* and liked what was in it so well that I subscribed for it for a period of three years. You also sent me the booklet, "Compost—How to make it." I made a compost heap but the results were not as good as I expected as the weather was dry. However, I spread the compost around my prize apple trees of which I have about 15 varieties. I applied about 4 inches of compost and spaded it into the ground lightly. For the first three or four weeks I could see no improvement in the trees. But about the middle of September the trees which had been composted started growing and kept on growing until the beginning of December. Some branches grew by actual measurement as much as 14 inches and developed the most beautiful leaves I have ever seen on an apple tree. When all the leaves of the other apple trees were brown and fallen to the ground, the composted trees were still vigorous and green. I personally thought it was quite wonderful.

Now I do not know if this will hurt the trees. I have 65 fruit trees and next spring or as soon as the weather permits I shall compost in the same manner all my trees. I already have composted the grapes, berries, and rhubarb.

P. W. Schreiter, Sr.,
7631 Lynn Ave.,
University City, Mo.

—o—

## CHEMICAL FERTILIZERS SPOIL POTATOES

April 7, 1948.

Gentlemen:

With much interest I have read "Chemical Fertilizers are Detrimental to Soil and Health." As a chemist for the past 20 years I have been working

in the utilization of farm surpluses and wastes, and have made many useful products. I worked for 3 years with the Michigan Food Products Company where I had charge of laboratory and plant control which put me in contact with all kinds of potatoes and vegetables for dehydration for the Government. Michigan farmers raise many potatoes and beans which have been overdone to such an extent that the soil has lost all its natural potash which, 60 years ago, was plentiful and at that time produced fine healthy crops. But in the immediate past, farming has become industrialized and chemicalized. The greatest damage occurred in 1947 when the potatoes were of such low grade that it was difficult to produce dehydrated potatoes of a standard grade. I did some research and found the following difficulty: 1) the seed was not planted deep enough and very little rain fell during the first six or seven weeks after planting, 2) at the time of setting on of the new tubers we had too much rain and the tubers absorbed too much of the strong, highly soluble potash salts, and 3) the potatoes exposed to the hot sun on the surface of the ground turned brown in color and assumed a sweet taste because the starches had been converted into dextrose. This made the tubers unfit for human consumption and they were refused by the Government. In this case it would have been better had no commercial fertilizer been used. I have found many other degenerate conditions and diseases in vegetables caused by chemical fertilizers which cause great damage under certain weather conditions. A good-looking potato is not always the best, and in place of giving honors and prizes to good looks and bumper crops at potato exhibitions and fairs, they should be given to those who produce the healthiest and best potatoes for the health of the consumer.

Herman C. Nielson,
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# The Place of PROTEIN in the ORGANIC METHOD

THERE is more than sufficient evidence to show that people who eat food that is raised organically are healthier than those whose food comes from farms where the more concentrated chemical fertilizers are used. By organically raised crops we mean crops raised on land where none of the artificial fertilizers are used but instead composts, rotted animal manures, green manure crops, ground limestone, raw phosphate rocks, and other ground-up rocks that do not contain certain elements in too high a concentration are applied to the land. We organiculturists have been held up to reproach and stigmatized as cultists because our opponent friends either are not well informed about what we stand for, or if they *do* know, distort the facts for various reasons.

They are telling the public that we believe only in applying composts in gardens or on farms. This they say is wrong because if there is a deficiency in the soil, composts made from materials that stem from that soil will not correct the deficiency. We agree with them, although if leaves are used from deep-rooted trees and plants, they will bring up from inexhausted strata, minerals that are not present in the upper soil layers. These critics continue to accuse us of advocating the use of composts only, even though in every issue of this magazine we advise differently. Even Louis Bromfield, the friend of the organic movement, in his latest book *Malabar*, has an extremely long chapter in which he attacks the organic "cultists" because they believe in the use of compost only.

Be that as it may, the chemical crowd never mentions the health aspect of eating foods raised the organic way because I am sure they feel they would be on dangerous ground if they did. Why should organically produced food make us healthier? No doubt there are many reasons and we have discussed some of them from time to time in this publication but I will limit this discussion to one phase, to a new theory that in food raised organically there is more protein and protein of a higher quality. It is altogether possible that the proteins of plants grown in soil with artificial chemical fertilizers may be made up of the same elements in the same proportional amounts, but in altogether different arrangements in the protein molecule. The intramolecular arrangement of the atoms determines the real nature of the protein in the diet. Dr. Arthur Tobolsky of Princeton University, on the General Electric Science Forum program showed how

chemists are learning to synthesize giant molecules, that is to form them by linking together simple molecules. They are doing this in the production of artificial rubber.

"But," says Professor Tobolsky, "the chemist has not yet succeeded in imitating nature completely in the production of giant molecules. Although we can produce a rubber with the identical chemical composition of natural rubber, the synthetic is not identical to the natural product because its atoms are arranged in a more random fashion." In the same way, the proteins produced in a plant where the nutrition of the soil is disturbed by the use of strong chemicals, may have a different than normal arrangement of atoms. Proteins are extremely complicated in their make-up and formulae. We do not definitely know what the effect of changes in such arrangement of structure may be, but we should make the necessary investigations immediately. Sir Albert Howard was the first to draw my attention to this relationship.

In his last book *The Soil and Health* he describes the work of J. E. R. McDonagh who has suggested that disease viruses originate from protein in the human body. "If the sap in plants" says McDonagh, "does not obtain from the soil the quality nourishment it requires, the protein over-expands which . . . . results in a portion of the protein being broken off, and this broken-off piece is a virus. The virus, therefore, is formed within, and does not come from without, but protein damaged in one plant can carry on the damage if conveyed to other plants. The protein in the blood of animals and man suffers the same damage if it fails to obtain the quality food it needs."

Sir Albert comments on the above in his book *The Soil and Health* as follows, "According to this view of disease, the heart of the subject must reside in the proteins. If these are properly synthesized in the plant, their disease-resisting powers first protect the crop and are afterwards duly handed on to the animal and to man. If, therefore, we see to it in our farming and gardening that the effective circulation of protein from soil to plant, and then to livestock and mankind is maintained, we shall prevent most of the departures from health—that is to say, disease—except those due to accidents or to abnormal climatic conditions.

"Extremes of climate, by tending to damage the proteins, remain as factors in the causation of disease . . . The synthesis of proteins in Nature is intimately bound up with the nitrogen cycle. The proteins made in the green leaf represent the last phase in this nitrogen cycle between soil and plant. When these proteins are manufactured from freshly prepared humus and its derivatives, all goes well; the plant resists disease and the variety is, to all intents and purposes, eternal. But the moment we introduce a substitute phase in the nitrogen cycle by means of artificial manures like sulphate of ammonia, trouble begins which invariably ends with some outbreak of disease and by the running out of the variety."

The medical profession which comes into the picture after a certain amount of viruses have been produced in a body would do well to teach us how to prevent this from occurring. Only a few days ago the College of Physicians and Surgeons of Columbia University announced that they had isolated a virus in breast cancer cases in mice. It is almost certain that viruses, which bring about such diseases as infantile paralysis and influenza, are produced from unhealthy or inferior quality protein. Now we have two factors, one—are we getting sufficient protein in our diet? Two—is it good quality protein? But before we go any further let me give you a few facts about protein in the human body so that you may see how important it is and that it is *life* itself. The fountain of youth is in the protein molecule. In the South many persons came down with pellagra because their diet consists of too much corn. Why? Be-

cause they have used so much chemical fertilizer that the corn is too much starch and not enough protein and is deficient in essential vitamins. On the other hand, in Central and South America Indians have been known to exist on a diet of corn, even greater than in our own South, and they are extremely healthy. Protein content and vitamin comparisons should be made.

Protein, along with carbohydrates and fats, is utilized by the body as a source of energy, but in addition to this, protein builds new tissues. All our living tissues, our muscles, flesh, bones, skin, hair; our organs—the heart, liver, etc. are made of protein. Proteins also are the enzymic forces, the catalysts that digest the food in our stomachs. They create the hormones. The vitamins are usually associated with proteins.

Our blood is a solution of protein molecules. Physicians study certain protein molecules because of their effect on the resistance to disease. The antibodies, the little soldiers of the body, which are called forth to protect the body when disease comes, are large protein molecules. The red corpuscles, the white corpuscles of the blood are made up of protein. All the enzymes which are so valuable in conducting the various processes of the body are large protein molecules. Protein is the chief substance necessary for life. A simple mixture of amino-acids (the building blocks of proteins) will sustain life. James S. McLester, M. D. (Nutrition and Diet in Health and Disease) says: "In fact, dogs which have been fed solely on a carefully planned mixture of amino-acids not only have maintained nitrogen-equilibrium, but also have added new tissue to the body." Starling, in *Human Physiology* says, "protein cannot be replaced by any other foodstuff, since it alone contains the necessary elements as well as the groupings of these elements which are essential for the building up of the living tissues."

On the other hand the amount of carbohydrate stored in the body would last a person only a day or two. So you see that man is made up of protein and he must look to the quality and the amount of this substance that he ingests. As the body gets older this becomes even more important because it becomes more difficult for the body to produce sufficient enzymes (protein) to conduct the body processes. That is why in older persons there is a gradual breakdown in the body functions and they suffer from impairment of mental and other faculties.

Even in cancer it is the proteins in the nucleus of cells that are involved and one of the latest theories in the attempt to find a cure for cancer is to get radioactivity right into the cell nucleus. How much more effective it would be to feed the body protein of the highest quality so that the cell could be strong and healthy. A healthy cell does not go cancerous.

Here is an item that appeared in the *N. Y. Times* recently: "The importance of correcting protein deficiencies in the diet of children is emphasized in a report on a study of pupils in Syracuse schools made by Dr. Ralph R. Scobey, associate professor of clinical pediatrics of the College of Medicine of Syracuse University. In an article in the final report of the New York State Joint Legislative Committee on Nutrition, Dr. Scobey says children receiving insufficient protein fail to respond significantly to supplementary vitamins, although signs of vitamin deficiency are often present; when the protein deficiency is corrected, the response to vitamin preparations is more evident.

"During the 1945-46 school year in Syracuse 1,789 children were examined and it was found that 1,357, or 75.8 per cent, showed physical defects.

"Among the specific diseases studied in connection with nutritional deficiencies was ringworm. Dr. Scobey says the increased incidence of ringworm may be related to protein deficiencies."

We have made tests ourselves of foods produced on our own farm

which have consistently shown a higher protein content than similar crops produced with chemical fertilizers. Father Retzek, one of our contributors, has found the same to be true in experiments he has made. Sir Albert Howard did considerable research in this field, and clearly showed that organically produced food is rich in protein.

Dr. William A. Albrecht, head of the soils department of the University of Missouri has been drawing attention in recent years to the fact that artificial fertilizers cause the plant to produce less protein and more carbohydrate. In the Kenosha, Wisconsin *Evening News* of May 1, 1948 he is quoted as follows, "During the past 10 years the protein concentration of feed grain in the corn belt has dropped from approximately 9.5 to 8.5 per cent." Think of it, a 10½% reduction in protein content in the corn belt in only 10 years. Is this reduction in proteins the result of the advent of hybrid corns or to the increased use of chemical fertilizers, or to both?

This is terrific when you think that ten years is only an atom in the endless infinity of time. What will happen in a hundred years, in two hundred, if the corn belt continues its present practices? And bear in mind that this 10½% measures only the quantity reduction. It does not take into consideration any diminishment in quality which must occur with this type of fertilization. While everything looks rosy on the surface, this simple innocent-looking fact, this statement showing a drop in protein may be the specific indication that our civilization may be in the process of disintegrating right now. Did you know that when Rome fell the people at the time did not know it? It was historians hundreds of years later who looked back in perspective and saw what happened. Are we in such a state now? We point with pride to the mortality statistics, but we do not have enough hospitals for the sick. One of my friends who had to have his appendix removed recently had to wait a week to get into a hospital. All the beds were occupied. This condition prevails in hundreds of hospitals today.

We point with pride to our wealth, to our automobiles, to this and to that. The Romans at the time of their fall were no doubt pointing with pride to many things, but Rome fell in spite of them. We must open our eyes to the kind of farming that is being conducted today which if not curbed in some manner will slowly but surely destroy us.

Let us go back to the Kenosha, Wisconsin news item and Professor William Albrecht. He continues, "The bulk-producing and fattening powers of our farm production have held up. But the power of promoting growth and reproduction through the protein in feeds, has gone down.

"Hybrid corn that disregards its need for reproducing itself, does not report to us lower soil fertility by showing its increasing sterility. The carbohydrate, or fuel for energy food produced by this crop holds our attention. But little thought is given to the declining soil fertility that makes seed production and thereby the plant's reproduction impossible.

"Animal sterility, too, is an increasing problem. Crop juggling with bulk as the objective, has brought more fat and energy producing forages and feeds into our system of land use. With them have come increasing animal deficiencies. We are not apt to see declining soil fertility as the basic cause. Instead, we are likely to build a false hope on artificial insemination and other contrivances of the breeding business.

"Seemingly only by more disasters will we eventually come to see that soil fertility is the source of vitally needed protein. Protein not only represents the power of reproduction, but the power of growth itself.

"We cannot continually move westward to fertile virgin soils. We must face the problem of dwindling soil fertility now that we can no longer run away from it."

Albrecht is one of America's greatest

agricultural scientists of the present day and it is remarkable how he has hit the nail on the head with regard to protein deficiency. It would be wonderful if he could go a step further and come out openly for the organic method, so as to counteract this deplorable protein reduction tendency. In the news item Albrecht refers to some disadvantages of hybrid corn. At a meeting of scientists held in the middle west recently the fact was mentioned that two good crops of hybrid corn will extract practically all the fertility from average soil.

One of the causes in producing an over-supply of carbohydrate and a reduction in protein is the too liberal use of potash in our chemical fertilizers. This error is quite common in our conception of chemical farming and is due to the fact that too many farmers and agronomists are not health conscious. If physicians were to make a careful study of the production of our foods as it affects the public's health they would promptly come upon this error. The facts relating to this potash-carbohydrate-protein relationship are so interesting that it will be discussed at length in the next issue of this publication.

In the meantime let me draw your attention to one of the best protein foods available—salt-water fish. This is one of the few food products that chemical fertilizer has not yet touched. Its quantity and quality are high as confirmed by the health of many races of people that make fish a major portion of their diet. I would recommend also the taking of vitamin A and D made from fish liver oils. There you have the very quintessence of protein.

J. I. RODALE.


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ORGANIC GARDENING EMMAUS, PA.

# Two Oriental Vegetables — Chinese Cabbage *and* Chinese Mustard

By ARCHER P. WHALLON

As to whether these characters are the right words for the plant commonly known in this country as Chinese or celery cabbage, I am a little uncertain. For though given as the Chinese words for cabbage (literally, white vegetable) in the language textbook before me, they are not the same in pronunciation as Pe-Tsai, Chihili, or Wong Bok, the varietal names of American seed catalogs. However, from a practical standpoint it matters little and does not dispute the fact that this vegetable is one of the most useful garden crops, deservedly attaining a commercial appreciation. Nor does it affect the value of the crop; that the plant is botanically a mustard and not a cabbage, though it may cause a little confusion with a different plant offered as Chinese mustard.

The Chinese or celery cabbage is really the one best raw salad plant, and one of the best boiling vegetables. It has the advantage in this latter respect of being nearly odorless. This vegetable can be used in about every way that common cabbage is used, with the possible exception of making sauerkraut. As a raw salad it might well be substituted for head lettuce in most all cases. In fact, when following a strike in Californian lettuce fields, there was a shortage of head lettuce in eastern markets, some hotels and restaurants substituted Chinese cabbage on their menu to the entire satisfaction of their patrons. Chinese cabbage has the further advantage of being a much better keeper than lettuce, as it will keep for a month or more, though it lacks both the keeping quality and resistance to frost of common cabbage.

From the grower's standpoint, ease of production is not the least merit of this crop. It is only required to drill the seed in the rows where the plants are to grow, thinning to about a foot apart. It should be understood that the plants do not stand transplanting well, and the seed should not be planted too early, as the plants will run to seed in hot dry weather without making heads. The crop matures in eight to ten weeks. For most of the northern United States and Canada from the middle of June to the first of

August is the right planting season. However, there is risk in too late sowing, as frost will spoil the crop.

The three varieties listed in most seed catalogs are: Chihili or Pekin, Pe-Tsai, and Wong Bok. Of these, the first is the tallest, largest, best keeper, and in all things considered the best. Pe-Tsai is the older intermediate type, and Wong Bok is a shorter, thicker plant, possibly the surest header and quite desirable for the home gardener and the amateur. This crop is also ideal for furnishing green feed for poultry and small livestock. It is but very infrequently bothered by insect pests. As the seed is one of the quickest to sprout, it is sometimes used as a "row-marker"; a small quantity being mixed with slow germinating seeds, like parsnip or onions. The Chinese cabbage comes up in two or three days and permits row cultivation long before the main crop is visible.

Another leaf crop, though having some features of similarity with Chinese cabbage, cataloged by some seedsmen as Chinese mustard, is really quite distinct. This, though a crop of lesser value, deserves more extensive cultivation. It forms an elongated, loosely folder head of leaves with thick stalks and midribs, somewhat like cos lettuce. Unlike Chinese cabbage, the flavor of this is mildly pungent, but not really hot like the other mustard varieties. There seems to be some confusion in the seed trade here, some seedsmen listing a large leaved mustard as "White Chinese," but this is not the true heading type grown by oriental gardeners in California, seed of which is sold by seedsmen of that state. There are two varieties listed in the seed catalogs, a white and a green, but if there is any real difference between them, it is very slight. This is also a very good salad and boiling vegetable. The plant is rather more hardy than Chinese cabbage. It is also good poultry feed and remains green and available in the garden row weeks after most other plants are frozen and withered.

Both of these vegetables are fully as useful as Swiss chard, celery, endive, lettuce, or spinach and should be as well known and as extensively cultivated.

Chinese cabbage above, apparently is a native of China, where it has been under cultivation for 1500 years. The principal varieties are *Chihili,* which grows to a height of about 18 inches and has a solid, tapering head; *Pe-tsai,* which attains a height of a foot or a little more and has a fairly compact but broad head; and *Wong-bok,* a plant 8-12 inches high which produces a rather loose, broad head.

These plants grow best in a rich sandy loam which has been well enriched with compost. The seeds may be sown anytime from May 1 to July 1 when the plants for the fall crop should be started. The growing plants require plenty of moisture. Good muck lands will grow good crops of these oriental salad plants.

# Basic Ideas of The Indore and Biodynamic Methods

By DR. EHRENFRIED E. PFEIFFER

SIR Albert Howard's Indore Composting Method and the Biodynamic Method of Dr. Rudolf Steiner have much in common. Both methods aim to improve the soil by increasing the organic matter content, by manufacturing humus from agricultural and other wastes. The biological concept that humus "holds" the soil, improves the state of health in plants, builds up resistance to diseases and pests and permits the growing of well balanced crops, or in other words plants with an increased health-giving nutritious value, form the basis of both methods. One should, therefore, never attempt to build up an antagonism between these two ways of composting. Both lend themselves to the purpose of transforming crude organic matter into humus. Both have from their very beginnings acknowledged the importance of the earthworm and soil building bacteria.

The writer and Sir Albert Howard, in the course of a meeting some ten or eleven years ago, found they had many fundamental points of view in common. The observation of soils and of the inability of modern, especially of the chemical and one-sided agricultural methods to solve the problem of health and nutrition has led both Sir Albert Howard and Dr. Rudolf Steiner, to an organic concept. The approach and the historical development were, of course, different. Sir Albert Howard was stimulated by the study of Eastern composting methods in India (and China) which had evolved there as a result of thousands of years of agricultural necessity in overpopulated rural areas. He has brought to us the condensed extract of the striving for survival of Indian agriculture: not to waste anything at all but to conserve it and to transform all refuse into humus. Three decades of empirical study were at the basis of Sir Albert Howard's message when he first spoke about the Indore Process at the Royal Academy of Arts in London and published the fundamental brochure with Y. D. Wad: "The Waste Products of Agriculture; their Utilization as Humus," in 1931; and also, with G. Howard in 1929: "The Application of Science to Crop Production."

Sir Albert Howard's idea is to collect all organic wastes and pile them up in compost heaps, in touch and covered with earth. Special compost pits and yards were to be built and the bottom of a well rotted heap was to be used as "inoculant" for the beginning of the next heap. How both methods blend together appeared one day when the writer disclosed his observation that thin layering of materials in a compost heap fosters a better and quicker fermentation, than the mere piling up at random. At the same discussion Sir Albert Howard revealed that he had approached a similar conclusion. Since the same natural laws of humus fermentation apply to both methods they must lead to the same conclusions.

Rudolf Steiner's (an Austrian) point of departure for an organic concept developed on the basis of Central

European agriculture and particularly of the old-fashioned methods of a peasant farmer's culture of the Alps. Here, too, a struggle for survival in the rugged mountains with steep slopes and little earth to cover the rocks had been going on for at least a thousand years. It was, in fact, a successful struggle, for even today the symptoms of erosion are unknown on such peasant farms. But modern agriculture in Central and Western Europe has produced severe symptoms of decline: the loss of humus, even though crops have increased quantitatively through fertilizer methods, the increase of pests and insect damage, the rapid decline of the stability of seed and plant varieties. In old times alfalfa, for instance, would last for 7, 9, even 30 years. Clover fields would last a decade and did not need to be reseeded after 2 or 3 years as is customary today. Old pastures improved and did not increase in acidity. Seed from grains could be used for generations on the same farm, while now one has to buy new, certified and selected seed almost every year. These symptoms of degeneration in the midst of "progress" stimulated a group of German, Austrian and Swiss farmers to ask Dr. Steiner's advice in 1921 and 1922. The first rules for the biodynamic method were laid out in 1922 and confirmed in an agricultural course in 1924. The biodynamic method was then in an experimental state for about 8 years and then, in word and writing was presented to the public. It is, however, only recently, during the last ten years, that more scientific data could be collected in support of this method. It was also developed on an empiric basis, field tests are now completed with laboratory tests.

The approach of Steiner was one of nature-philosophy, trying to grasp the organic idea founded in the fundamental problem: What creates a living being, an organism; what holds together all the functions of life?

Whoever wanted to apply the Indore method could start out from scratch. If he was willing to spend the time he could build the compost heap and the result was there. This is what made the Indore method so popular, spreading over the Western world like a prairie fire.

It is however, not true that there is anything mystical or secretive about it. The "secret" formulas of the biodynamic preparations are not a secret anymore, in fact, they were published by an outsider, Schomerus in Germany 15 years ago. They were merely overlooked by the English reader. Nor does the fact that Rudolf Steiner was the founder of Anthroposophy, a philosophy which acknowledges the primacy of spirit over matter, mean that he who wishes to apply biodynamics needs to become an Anthroposophist. He is perfectly free to believe in whatever he wants, the biodynamic literature bears witness to that.

These are the main differences between Sir Albert Howard's and the biodynamic methods: The fermentation in an Indore compost pile takes place as nature chances to arrange it. Admittedly, with the proper piling up, interlayering, adding of lime and covering of earth the best possible conditions are given for a humus formation: the natural processes will induce themselves, more or less favorably. Were the writer an opponent of the Indore Process—which he is not—then he could say: the fermentation starts at random. If nitrogen fixing bacteria are absent in the plants and soil used for such a compost then the final result will be that the compost is low in nitrogen. This is not the fault of the Indore method but of the man who has set up a deficient compost and he should blame himself. Composting is in fact a science. You just earn what you have started. A pile set up loose, with lots of air pockets in it, insufficient moisture, will heat up and break down very quickly. But again, through the action of thermophile bacteria (and gas forming clostridia) the material will be poor in nitrogen, though cellulose will be well

broken down. This the biodynamic method tries to avoid. It prefers a cool rather than a hot fermentation in order to preserve nitrogen, even though the fermentation may be somewhat slower. Also with a warm or hot fermentation gray mold develops on or right underneath the surface which will effect a speedy breakdown. Sir Albert Howard showed such grayish areas to the writer. He evidently did not make a chemical or bacteriological analysis of these layers and compare them with the moist, dark brown layers, otherwise he would have discovered their low nitrate content as against the high nitrates in the brown moist layers; the absence of Azotobacter in the first, their presence in the second case.

The composting methods will certainly improve, their scientific investigation will add new data—such is progress, and in bringing it about the fundamental idea will not be contradicted. It was because of these observations of chance-fermentation that the biodynamic method introduced certain plant preparations to be inserted in the compost and manure heap in order to direct the fermentation toward the best possible goal: humus, without losses, or even better, with increase of nitrogen. The preparations are made from medicinal plants such as yarrow, chamomile, dandelion, valerian, weeds like sting nettle, and oak bark, all of which have been shown to produce a specific type of humus, rich in growth hormones and ferments. They are mixed and decomposed with animal organs like the peritoneum, mesenteron and intestines of healthy animals (rich in factors recently discovered to be growth and healing stimulates of the connective tissues), deer bladders (growth hormones), animal skulls and horns (growth factor). On a later occasion an article will be published, discussing these matters and scientific tests made of them. The resulting preparation-humus is used as an inoculant, and is rich in growth and fermentation stimulating factors as well as in nitrates, phosphates and, as recent spectrographic investigation has shown, in rare trace elements which act as biocatalysts. Already in 1924 Steiner laid particular stress upon the importance and necessity of having trace elements present in order to direct the healthy growth process. Much of this has only recently been confirmed. Through the work of Wischhusen, Allison and others, it has been established that manganese, cobalt and copper in dilutions as high as 1 to 10 parts per million make animals and human beings resistant to certain diseases, Bang's disease or undulant fever, for instance, these elements being absent in the blood of the pituitary gland of diseased animals. Growth hormones act even in dilutions of 1 to 1 billion. In higher concentrations they do not move or even hinder the growth. The most recent research is confirming the original biodynamic ideas. There is nothing mystical about it, the secret was only nature's secret, which is slowly and gradually revealed now.

The logic of using these preparations in addition to a proper compost building procedure is the same as the logic which leads to using yeast in a bread dough, to make it rise and adding certain ingredients which stimulate the yeast to grow and multiply.

Then there are the questions of crop rotation, companion plants, and green manuring. We farmers of today have to face a twofold problem: first to restore humus which has been lost, then to maintain this humus at its highest level. All wastes restored to the field will only replace the losses. The wastes have to be improved and conserving methods be introduced to maintain the humus level. Crop rotations where potatoes follow potatoes, corn follows corn, and grain is grown in succession for more than two to three years, will gradually deplete the soil and the humus will vanish even though one might "refill the prescription" for the major minerals. Conserving crop rotations therefore insert rest periods with grasses, pastures, hay, legumes. Legumes restore nitro-

gen to a greater extent than can be done with nitrogen fertilizers. The problem of green manuring is particularly instructive. Green matter ploughed under increases the organic matter content. But this is crude organic matter, not yet humus. The decomposition of this green material taxes the resources of the soil quite heavily and develops mainly break down bacteria. Certain crops will do well on this, others less well. It is evident that manure or compost ploughed under with green manure will bring better results. Green masses composted and pre-digested produce the best effect. Both methods have these experiences in common.

Out of the biodynamic concept of "what makes an organism" there has developed a wider concept in agriculture. Not only a plant, an animal, a human being is a closed organism within its own skin, but the soil, yes even a landscape is an organism, which can be healthy or diseased, can obtain all or part of the conditions for life. An organism is maintained as a species (through seed) within certain limits of time. It grows, but it also ages. If healthy it maintains its life for a longer period than if diseased. A garden or a farm, therefore, is also an "organism" with all its life-giving factors involved. The author has outlined this wider concept in his book *Biodynamic Farming and Gardening* and in *The Earth's Face and Human Destiny*. Louise E. Howard's book *The Earth's Green Carpet,* to every word of which the writer can fully subscribe, maintains much of this organic concept too. The pooling of all observation in this field is really necessary in order to make progress and enable man to enliven the soil again.

Rudolf Steiner spoke of the farm individuality. He meant to say that even as an individual organism has its own appearance within the laws of nature, so each farm has a sum total of life factors the observation of which is important to maintain its being and health. An orchard with only apple or peach trees is a biological absurdity and if economic reasons force one to introduce a monoculture one is acting against and not with nature. Every onesidedness will result in increasing diseases and pests. In fact, to keep a biological absurdity alive requires more effort and expense (sprays) than the care of a well balanced system. Overspecialization in the field of life is as damaging as it would be in the field of education. Were we only to teach our children to memorize poems or mathematical formulae, or science and no art and religion were taught we would (as was actually the case) raise human beings who may be very clever in one field but ignorant or inefficient in all others. The over-exaggeration of science, economics, technology has not developed moral and humanitarian qualities and this is one of the reasons why we speak of a decline of civilization, of the inability to solve human problems in the small individual world as well as in the larger world of relationships between nations and races. Or, as we can even read in scientific papers every day now, taught by atomic science and catastrophe: man has discovered atomic energy but has not yet learned how to use it to the benefit rather than to the detriment of humanity. Even so we can say, man has discovered science in agriculture, but is not yet willing to apply it beyond the mere growing of bigger and bigger crops at the expense of the soil capital. Instead he should apply it in such a way as to maintain the permanence of the soil fertility. The wider organic concept of agriculture, as voiced by Steiner in 1924, could be a beacon to shed light upon the unity of all life factors. This thought even lends itself to a simple mathematical equation: Life is a product of all factors. L equals f times a, times, b, times c, times, x, times y, times z. If one factor is changed all factors change. The product life (L) is a constant. Some factors (a, b, c) are known, such as seed viability, soil bacteria, major mineral elements (the big four: potassium, nitrogen, phos-

phates, calcium), many are still unknown or little known (x, y, z) for instance, the trace elements, humus forming processes, the influence of one plant upon another, etc. The unknown times the known, however, makes up the living conditions. To make the unknown a known is our challenge.

There is, to quote one example which needs immediate study, the organizing factor. We are no longer indulging in mysticism if we speak of it. Why does a certain reaction take place in a plant at a given time, place, and in a given direction? What organizes a plant so that certain minerals migrate chiefly to the epidermis (silica), or to the chlorophyll producing cells (magnesium) or into the seed tissue (phosphates)? Why does one plant absorb more calcium, another more potassium? Why can one plant protect itself against over- or luxury consumption of potassium (grains, weeds) and others not (grasses, clover)? What organizes all these processes? Why do certain minerals, especially trace metals, migrate to the liver, spleen, bone marrow, others into the inner secretory glands of the head? The answers to these questions are important in order to understand more clearly what creates an organism, a biological individuality.

Sometimes the study of pathology teaches more than the study of the normal and healthy. The exception makes us understand the rule. Cancer tissue in the human being shows characteristics of embryonic growth. But it means a development at the wrong time and wrong place. While embryonic growth is organized leading to a well shaped pattern, reproducing that of the parent organism, the cancer tumor contains a wild un- or disorganized growth. What is the essence of the organizing factor, can it be found and eventually made use of? These are questions which are bothering the modern scientist very much. It does not help to push these questions aside out of fear, or ignorance, or because they are difficult and we may have to change our pet theories. In the meantime soil depletion goes on, malnutrition appears in the midst of plenty, for our vegetables, grains and fruits are raised under onesided conditions. Cancer too continues to grow and spread.

## *Organic Method Adopted*

According to the December, 1947 issue of *Country Life,* the British Columbia Federation of Agriculture in annual convention (November 27, 1947) went on record as approving the advisability of adopting the methods of the late Sir Albert Howard in maintaining the fertility of the soil and the control of diseases and insect pests. The Federation requests the Dominion and Provincial Governments to allocate funds for the carrying out of experiments on their respective experimental farms at universities, and, if deemed necessary, on farms in different parts of the country.

# CELERY

## POPULAR SALAD, FLAVOR, and VEGETABLE PLANT

By WILLIAM H. EYSTER, Ph. D.

CELERY is a native of Europe and still grows as a wild plant in England and in the Mediterranean region. It grows in marshes and other wet habitats, and becomes a rather rank and tough plant. The wild plants have a rank flavor and for a long time were believed to be poisonous. However, it is believed by some that celery was known to the ancients and was used by them as food. In various parts of the United States, celery has escaped cultivation and is becoming naturalized in marshlands.

Celery belongs to the parsley family which can be recognized by the umbrella-like clusters of small flowers, compound leaves with fleshy petioles that clasp the stem at the base, longitudinal flutings of the usually hollow stem, and characteristic oils to which the plants owe their odor and taste. Other members of the parsley family which are grown in our vegetable gardens are parsnip, carrot, parsley, coriander, and sweet cicely. The wild parsnip which is exceedingly common was used by the Indians as a medicinal plant. Water hemlock, another member of the parsley family, which grows as a common weed along our streams produces a violent poison. It was the juice of this plant that Socrates drank when he was condemned to death.

It is only in recent years that celery has become one of our most important food plants. It may be grown successfully in all parts of the United States, but it prefers regions of low humidity, warm, sunshiny days, and cool nights. In growing celery it is well to remember that it is by nature a marsh plant and requires plenty of water and a soil rich in humus. Like most members of the parsley family, celery is a biennial, i.e. a plant which makes a strong vegetative growth one season but does not produce flowers and seeds until the following season. By selection and breeding, many varieties of celery have been produced. The leaves of most varieties turn yellowish white or pink when blanched. The leading self-blanching varieties are *White Plume, Golden Self-blanching, Rose-ribbed Self-blanching,* and *Cornell.* The best known green-stemmed kinds are *Giant Pascal, Winter Queen, French Success,* and *Boston Market.* The part of the celery plant that is used for food is really the leaf stalk or petiole.

Celery does well on any good loam rich in vegetable matter or compost, and capable of retaining moisture well, or easily irrigated. Most of the commercial celery is produced in the muck or peat soils in the states bordering on the Great Lakes, in California, and in Florida. The soils in these areas are moist, friable, and loose and rich in organic matter. They are easily worked and as a rule do not require irrigation. In the best celery mucks, the watertable is about three feet below the surface of the ground. While muck soils possess marked advantages for extensive cultivation of celery, almost any type of soil can be conditioned for growing celery by incorpo-

rating into it of a sufficient amount of compost. The more compost that is incorporated in the soil, the easier it will be to get along without the artificial application of water by irrigation or by sprinkler.

The home gardener will find that celery can be grown at its best in the rock vegetable garden. The young plants should be set six inches apart in trenches which contain enough compost to give the soil a decidedly dark appearance. The trenches should be about 24 inches apart. The spaces between the row trenches should then be paved with native stones and rocks, preferably of such sizes and shapes as will lend themselves to forming a stone mosaic. The stones act as an effective mulch which protects the earthworms, increases the aeration of the soil, keeps the soil moist and cool, and makes it possible to walk among the celery rows even after a prolonged rain, or after irrigation. The wonderful growth made by celery in the rock garden leads one to believe that the rocks may have other favorable influences on the growth of plants not here mentioned.

Celery is regarded as one of the hardy vegetables, but the plants cannot stand severe freezing without injury. For the early crop, the young plants should be set out in the open only after all danger of severe frosts is past. In most northern states, this means about the first week of May. Plants set out at this time should be ready for harvesting late in July or early in August. Late plantings should be made late in June or any time during July, depending upon the variety, weather, and the soil. In all cases the soil must be rich in humus or enriched with compost. If the plants are more than six inches tall at the time they are transplanted, the tops should be cut back to establish a reasonable balance between the roots and top.

Diseases of celery can be largely prevented by proper care in growing the seedlings and the practice of sanitation. The seedlings should be grown in a mixture of equal parts of leaf mould and sand. When they are an inch tall, they should be transplanted in flats about two inches apart each way. This will permit a free circulation of air between the plants. The soil in the seed flats and transplant flats should be kept moist but not wet. The seedlings should be grown in a cool, well-lighted, airy place. Plants grown in this manner are, as a rule, free from blight and other diseases. Often seedlings and transplants purchased from a commercial grower are so badly infested with blight that it is difficult to grow the plants to maturity. It is for this reason that a careful gardener insists on growing his own celery plants from seeds.

Inasmuch as celery is by nature a marsh plant with a shallow root system, it is better to grow it by surface mulching rather than by clean cultivation. In addition to the stones, many plant materials may be used to mulch celery plants, but compost is by far the best. Do not use fresh manure of any kind as is recommended by some of the experiment stations, for it will surely spoil the natural flavor of the celery. Plants grown in a well composted soil with just the right amount of moisture will have fleshy, crisp leaf stalks which do not have the vascular bundles hardened into tough strings which wedge between the teeth of those who eat it. Celery, like other salad plants, is best when grown most rapidly.

Celery should be allowed to grow as naturally as possible. Some gardeners in the past have gone to great trouble and expense to blanch the leaves in preparation for the market or the table. This practice is not warranted unless the market demands blanched celery. The methods used in blanching celery subject the plants to conditions which favor the development of blight and other diseases. The natural unblanched, fleshy, crisp leaves rich in chlorophyll are more nutritious than the blanched, diseased plants. The green color in the leaf stalks, called chlorophyll, is a health-promoting plant pigment.

Celery may be taken from the garden for table use for flavoring foods, for making salads, or for a vegetable food at any stage in its development. It may be on hand in the garden from about the fourth of July until frosts make it necessary to harvest and store it for winter. For storing, the plants should be lifted with a shovel or fork and some but not all the roots cut off. Commercial growers have a special U-shaped steel cutter for cutting the roots so that the plants can be lifted out of the ground. Celery should be stored in a moist, cool place, and only good healthy plants should be stored. Suitable storage places are cellars having no heat, outdoor caves, or outdoor trenches in soil that is well drained. The plants must be set in the storage trenches with roots end down, and all conditions made favorable for growth but the temperature must be kept low. The trench should be of such depth that only the very tips of the leaves extend above the level of the ground surface. Over the trench may then be placed boards nailed together to form an inverted trough which, in turn, must be covered with suitable insulating material as corn stalks, leaves, or other plant material. Celery may also be stored in coldframes.

CELERY THRIVES IN THE ROCK GARDEN.

# *Homemade Bread — the Staff of Life*

By ADELHEID PFEIFFER

IT takes more than the looks of a loaf of bread alone to tell us whether it is really nourishing or not. Much of our modern bread is very little more than a mixture of cellulose and starch plus something to make it rise. As our medical authorities confirm, there is very little nutritious value in a completely white bread. The bleaching of the flour does not add anything of value to the bread either.

If we want to have bread that will really feed us we will have to go back to the bread of our ancestors, the whole wheat and whole rye bread. Many people nowadays have had their taste so spoiled that they want white bread, not knowing that it only fills them up and does not feed them. Scientists have made experiments by feeding white bread and boiled milk to test animals with the result that these test animals died of starvation after four to six weeks. There were mineral and vitamin deficiencies. No wonder the white bread sold today must be enriched with vitamins and minerals.

The art of making good bread has been lost. In order to produce a good homemade bread the first thing, therefore, is to secure a whole wheat or whole rye flour. By "whole" we mean that everything which has been in the original seed kernel of the wheat or rye is still in the flour, the bran and everything, nothing taken away from it. Only from such flour can we really obtain a nourishing bread. Proteins and the vitamins, for instance, stick to the inside of the outermost layer around the grain, if we remove the bran there is not much of anything left in the white flour. Many housewives who try to bake bread have difficulties in using whole wheat flour because its fermentation and rising qualities are so different.

We have to realize that whole wheat flour is still living, there are processes of fermentation going on in it. This is one of the reasons why the milling industry tried to kill this flour, because it kept changing. It did not keep; the wheat germ oil in it, for example, got rancid. Whole wheat flour cannot be stored indefinitely as it will lose its quality. These all were practical and commercial reasons to do away with it. If it is at the expense of human health, and if it causes malnutrition, as we are taught now by our doctors, then we have to find ways to make this whole wheat flour useful again. In my own experience with baking bread I have found that for the ordinary farm household there is no difficulty at all to store the grain and to store the flour for a certain length of time. It is an established fact that whole wheat flour keeps much better when the grain is not milled immediately after

the harvest, but if one waits at least two months so that an after-ripening process in the grain can go on. After that time the flour will keep much better than it would otherwise. The flour itself, after the milling, has to steam out. If it is kept in bags instead of a box, which can be well ventilated, these bags have to be moved frequently. At least twice a week they have to be turned over so that the steaming out of the flour can take place. In milling one also has to be sure that not too high a speed has been used and that the flour did not heat up too much. As anyone knows who has ever watched the milling of flour, steam comes out of the mills and the flour feels moist. This has to be avoided by a slow milling process. Many of our soft grains, grown in a humid climate, do not stand up under milling. But we have also seen that one can grow with organic methods a very good quality of grain which will lend itself to the production of a good flour. On our biodynamic farm we have never had difficulties in this regard.

Here is a good test for determining the baking quality of a flour. Take a handfull of the flour and make a fist, then open your hand again. If the flour stays well shaped and does not fall apart like chalk, then it is all right. It should be elastic and keep its form. If it falls apart, then this is a sign that the flour is dead, and it will not produce a very good bread.

Provided we have a good flour it is very simple to make good bread. The recipe I am using now has been very satisfactory. It is a kind of compromise with modern life. It produces a quick rising dough. The modern housewife has so many burdens that it is necessary to have a quick rising dough. Otherwise I would rather stick to the old-fashioned method. For historical reasons and also in order to demonstrate the very best way of producing bread I shall describe the old-fashioned method too. In the old days one used to have a slow rising process. Much less yeast was used than we use nowadays, and this yeast was gradually grown and developed together with the dough. About one-fourth of the entire amount of flour to be used and all the salt and all the yeast were mixed into a rather liquid dough in the evening. This was put in a warm place, well covered, protected from draughts, and then the yeast grew in this mixture, until early the next morning. The baker would get up very early in the morning, probably at four o'clock, and then make the second dough, by adding another fourth of the flour and mixing it very thoroughly with the dough, to a stiffer paste. This was then allowed to rise again. After an hour it was kneaded down or beaten down, the rest of the flour and water were added, and it was left to rise again for at least an hour or even two. It was then kneaded down again. The kneading has to be done very carefully and thoroughly. The dough was then shaped into loaves and placed in the pans; after another hour of rising it would be ready for the oven. This takes a lot of time, you have to get up early in the morning, and one can understand that this method is not very popular even though it may produce the most beautiful bread possible.

A busy housewife has to shorten this process, and this is how our present recipe came about. We have a household of eight and bake once or twice a week, as often as it is necessary. We use five and a half pounds of whole wheat flour, mix it thoroughly in a pan with two quarts of water, seven teaspoons of salt, two tablespoons of molasses, and two and a half yeast cakes. For more people the double amount can be used. Without a mechanical mixer the amount of dough is limited according to the muscle power of the hands and the forearm of the person who does the kneading. This is very well mixed and kneaded, then put into the bread tins right away. We use rectangular tins for loaves weighing about two pounds. It should rise there to about double its size, which in a warm place well protected from draughts, takes

about two hours. It is then baked for one hour at 400° F. It is better not to use this bread on the first day, it can even be left for two or three days before using. It might even keep as long as a week or ten days if kept in a cool place in summer. Occasionally, on very hot days, it might develop a kind of defect, if it gets too hot, in which the inner part of the loaf draws threads. In recent years we have not had this trouble, but many years ago we observed it. This can be overcome by keeping the bread cool. The addition of half a cup of acidophilus milk or sour milk will help to overcome this difficulty.

The bread will have a finer flavor and a nicer crust if a small amount of whole rye flour is added. The whole rye should never exceed 15% of the total amount of flour, otherwise the bread will be too crumbly and fall apart. There are two main difficulties in baking bread. The one is that the dough rises too fast, and when you cut into the loaf you will find a hole in the upper part, or the smaller holes are too large. The old folks used to say that the baker was chasing his wife through the hole. This happens when it rises too quickly, the temperature during rising is too high, or when too much yeast has been used. Usually, a little less yeast, and a slower rising at a lower temperature will correct this. The other difficulty is of course that the bread does not rise at all. In this case, it was either struck by a cold draught during the rising time, or the temperature was too cool, or not enough yeast was added. It might be necessary to break the kneading and rising processes into two periods, similar to the old method. This often happens with flour which has been milled from recently harvested grain, in the fall.

I have stated that bread and flour, if treated in the way described, is a living organism still. Consequently we cannot always obtain the same structure in our bread. One has to be observant of all the circumstances and of the original culture of the flour and adjust the rising time, the amount of yeast, etc. to the conditions. Even the weather plays a role here. We observe, for instance, that the structure of the bread and the keeping together of the crumbs is less good if one bakes it on a hot summer day just before a thunder storm. The yeast seems to multiply much faster on such a day. It would be better to bake the bread in the early morning hours, in such a case, when it is still cool. I have also observed that even though several people use the same recipe the bread does not look exactly the same. There are differences in flours, but there are also differences in the way people knead, and there is nothing to be done but just observe it, think over what one does, and then correct the conditions accordingly. You only have to keep in mind that yeast is a living cell which grows in the dough and digests part of the starches and sugars in the dough, and that is a biological process. This process is dependent upon atmospheric conditions, temperature, moisture, etc. Even as plants grow differently under different climatic and soil conditions so does the yeast grow differently in the "climatic" conditions of the kitchen. One should not become impatient if a few failures result in the beginning, gradually one develops the proper fingertip feeling for the mixing and preparing of the dough. We have also observed in the case of untreated flour that in the spring, in May and June, when the grain outside in nature on the fields is in blossom, the possibility of obtaining a homogeneous structure is not so constant. Rye especially responds at those times and it is very difficult to produce a good rye bread then. Years ago we were experimenting, and it was our decision not to bake any rye bread in May and June, for that very reason. These facts, of course, are not known to the modern baking industry where they work with a flour which actually has been "killed." There such differences do not appear as they would were a living material used.

There is no doubt that the baking in an old-fashioned stove or oven with a wood fire and indirect heat produces the finest bread. The flavor and the crust formation are much better. But right now we bake our bread in an ordinary kitchen stove and it comes out very nicely as all the members of our household and our guests can testify.

(EDITOR'S NOTE: Last fall the editorial staff visited Dr. and Mrs. Pfeiffer on their farm at Chester, New York. Just as we were about to take our leave in the evening, we were invited to have a cup of coffee and a piece of Mrs. Pfeiffer's homemade, whole-wheat bread and butter from the farm. Each of us ate two slices of bread. We planned to drive for an hour and then stop along the way for dinner. We did not feel hungry so drove all the way home without additional food. We couldn't help believe that Mrs. Pfeiffer's whole wheat bread is more than usually nutritious and is like the bread of old which was in fact "the staff of life.")

## *Soil Reaction and Vegetables*

So many factors enter into the growth of a plant that it is not possible to indicate accurately the optimum acidity of all our garden vegetables. However, according to the Connecticut Agricultural Experiment Station a rough grouping of some common vegetables according to different amounts of acid in the soil, generally expressed as the pH, is given below.

pH. 5.0 to 5.6 Acid to Medium Acid—Potato, Sweet Potato, Watermelon.

pH. 5.2 to 6.0 Medium to slightly acid—Eggplant, Pepper, Tomato.

pH. 5.6 to 6.8 Medium to very slightly acid—Beans, Carrots, Corn, Parsley, Parsnip, Pumpkin, Salsify, Swiss Chard, Turnip.

pH. 6.0 to 7.2 Slightly acid to slightly alkaline—Leaf lettuce, Muskmelon, Peas, Radish, Rhubarb.

pH. 6.4 to 7.6 Very slightly acid to medium alkaline—Asparagus, Cauliflower, Celery, Leek, Head Lettuce, Onion, Spinach.

# *Organic Methods Restored This Far*

By HERBERT CLARENCE WHITE

IN the April issue of my favorite magazine (*Organic Gardening* of course), I referred briefly to our last summer's tour through twenty-five of these United States. What we saw on this trip of some 8,000 miles has left in our minds and hearts an indelible picture of supreme contrasts.

It was a time of critical drought in many sections of the country. Heavy, even disastrous rainfall in the spring (See *Life Magazine*, August, 1947) had been followed by an almost total lack of moisture in the months that followed.

At the time of our visit to Western Michigan in early August there had been no rain for more than six

PLATE B

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## A PILGRIMAGE TO THE ENGLEWOOD FARMS OF MUSKEGON, MICHIGAN

PLATE E

PLATE A

weeks. Many farms and gardens were beginning to show unmistakable signs of a water shortage. Corn fields were withered and seared. Other crops were suffering almost as severely as the corn.

Then, like an oasis in the desert we discovered, almost by accident, a thirty-nine acre organic farm! Here's how it all happened. I was conducting a series of illustrated lectures on "Soil and Health" at the Muskegon Y. M. C. A. At the close of the first evening lecture, a tall gentleman pushed his way to the front and grasping my hand introduced himself as Fred Engle, of the Englewood Farms.

"I want you to see my organic farm," exclaimed this enthusiastic "doer" as well as "hearer" of the word. "I have a 39-acre truck farm, all of which is farmed the organic way! We began to use the methods you advocate long before J. I. Rodale ever started the *Organic Gardening Magazine*." Then the realization suddenly dawned upon our dull sensibilities that we were face to face with another leader in America's honor roll of "pioneer" Organic Gardeners—one who had of his own free will (mingled with a lot of good horse sense) abandoned the camp of Orthodoxy, to follow nature's "lead" in the restoration and care of "tired," worn out, depleted, lifeless soil.

Yes! When Fred Engle purchased those 39 acres of Muskegon sand in the autumn of 1919, he bought a "dead duck." He didn't know it then, but he soon found out, to his

PLATE C

own sorrow, and that of his family.

According to Engle's own story, he thought he was getting one of the best farms in Michigan. His father, a real estate broker, was instrumental in selling this farm away back in 1895—just 53 years ago. "At that time," Fred recalls, "my father remarked that this 39-acre farm was the best that had ever passed through his hands."

But something had happened during the intervening years to that once mineral-rich, virgin, humus-filled soil. Three times during those 24 years that farm had changed hands. With the continued "mining" of the soil-minerals came the consequent lowering of soil fertility, loss of humus, reduction of the teeming microscopic life, lowering of the water holding capacity of the soil, and last but not least, with the introduction of chemical fertilizers, came death and destruction to nature's perpetual fertilizer factory—the earthworm population. Thus the "wheel of life" was gradually, almost imperceptibly brought to a standstill.

This sad story of soil depletion on a once properous American farm is only "one of a million." It can be duplicated all the way from New York to San Francisco, and from Maine to Florida, and back again. Everywhere we find the sickening trail of neglect, misuse and "murder" of our most precious possession—the soil!

For decades greedy profiteers in the form of "Suit-case" farmers, and others almost as guilty, have taken *everything* out of the soil and put *nothing* back. According to *Life* Editor John K. Jessup, "What we have been begging for since the 18th and 19th Centuries, when a westering man didn't think he was much of a farmer unless he had exhausted two or three farms in a wandering lifetime, we have now abundantly got. The swollen, dirty rivers testify into either sea."

But let's get back to the Englewood Farms, and to Fred Engle's almost super-human efforts to "make a go" of that newly purchased possession. Came the spring of 1920. With high hopes for the future, and with utmost confidence in the power of the good earth to yield her proper increase, this erstwhile city dweller plowed, fertilized, and harrowed his full 39 acres. Potatoes, oats, corn, and a wide variety of vegetables were planted. Result?—a total crop failure!

Suddenly Fred Engle was brought face to face with the stark realization that his farm instead of being the

"*best* in the county," was actually one of the *worst*. He had been living in a "fool's paradise" in his hope that Mother Nature would perform a miracle for his personal benefit.

Twenty-four years of abuse under three different owners had reduced the power of his soil to the point that it could not and would not produce a crop. Fred Engle, like my Alabama friend, Neil Martin, "learned the hard way."

Not only did this near catastrophe jar Fred Engle into the consciousness that something was radically wrong with his soil; it left him on the verge of a dizzy precipice—Bankruptcy! "To continue on the farm would be nothing short of financial suicide," reasoned this unhappy, would-be agronomist. So Fred returned to the city. Here in the growing community of Muskegon he opened and operated the Englewood Food Stores. If he couldn't *grow* food, he could at least *sell* stuff that others had grown; and for seventeen years he continued to operate these stores.

During those years of waiting, did Fred Engle forget his 39 acres of no-good, worn-out sand out on Highway 6? No indeed! During all those years he studied agriculture. The more he studied, the greater his conviction grew that something was wrong with American orthodox agriculture. The basic truth concerning the importance of HUMUS as a "restorer" of life to sick, worn-out soils came to him, and Fred began to haul the offal and plant wastes from his food stores onto his humus-starved, depleted land. This enterprising merchant and "would-be" farmer also came to the realization that it was his responsibility to *restore* to the soil on his farm all of the important elements that went into the makeup of an animal or human body. How right he was!

It was 1936 before the Engles were ready to start farming again. By now young Edward was finishing school. He had spent some time in the garden beginning in 1933 while Dad worked in town, but was skeptical regarding the prospect of making it a life vocation. He told his Dad: "Two families just cannot make a living on this old farm. There isn't $1200 a year income on the whole place." It wasn't long however until young Edward had to "eat those words." He began to see possibilities in the new method. And how happy he is today that he made the decision to stick by the land.

Through with school young Ed joined his father full time in this new "soil building" program. In addition to the bones, fat, feathers, plus the large accumulation of vegetable wastes from the food stores, they were out searching for other more abundant sources from which to manufacture humus.

They began to clean up poultry houses, made friends with the owner of a near-by Fox Farm, poked their noses into a button factory for possible sources of wastes; got next to a sawmill operator and began to haul off saw-dust by the truckload; found a new interest in stockyards and dairies, and arranged with the managers for cow manure and casene from skim milk. "We had a one-ton truck on the go all the time" declared this busy pioneer soil builder.

Again the Engles attempted to farm ALL the land. Each year four or five acres were treated with compost humus. From 1936 to 1941 some commercial fertilizers were used in addition to the humus, but in diminishing amounts. In 1941 Fred was convinced that these "shot-in-the-arm" methods were doing him more harm than good, and he quit the use of all artificial manures. Since that memorable day in '41, the Engles have run a 100% Organic Farm. At that time, it seemed to all his friends that he had taken a radical step, and many dire predictions were made regarding the outcome. But time has put these simple methods to the test, and Fred has won out on every count.

One of the things that impressed me most was the fact that today Fred Engle farms only *two-thirds* of his total acreage each year. At the time

of our visit last August, thirteen of those 39 acres were shoulder high in *cover crops*. (Fred's shoulders—not mine! See Plate A.)

Fred Engle has proved to his own satisfaction at least, that peak production on a humus-filled soil will bring greater financial returns from 26 acres than will 39 acres with a less concentration of humus. Therefore, sheet-composting is the order of the day at the Englewood Farms. In addition to the extremely heavy and vigorous cover crops, 250 cubic yards of compost humus is manufactured each year and spread onto the land together with huge colonies of domesticated earthworms which are used to complete the breakdown of the heaps, and are then incorporated into the humus-filled soil.

No longer is the soil on the Englewood Farms "tired" or lazy! What a "sight for sore eyes" were those gorgeous acres of corn, potatoes, (See Plate B), tomatoes, cabbage, squash, cucumbers, pumpkin and melons. And berries? Brother, I hadn't seen such raspberries in years! All the other berry patches in Michigan that I saw last summer looked pale and sickly in comparison. In fact many of them were stunted and appeared half dead. But the Englewood raspberry vines were higher than your head, and were loaded with berries of superior size and flavor. (See Plate C).

Here are some of the facts and figures Fred Engle gave me on last year's harvest. To me at least, they make interesting reading.

"In Indiana they give a medal to the farmer who produces ten tons of tomatoes to the acre. If they were doing that in Michigan," Fred observed with due humility, "we would be covered with medals, for we took 1025 bushels weighing 61,500 lbs. off two acres." Nearly all of these were top quality fruit, with only four or five bushels of "seconds" in the lot. Engle also reported that in the fall, just before frost he stripped the vines, held them in storage for nearly a month, and marketed them as first quality fruit at "off-season" prices. And that, according to my opinion is something to "write home about."

"Last year we selected 20 bushels of our largest potatoes; one of these

PLATE D

bushel baskets weighing 60 lbs. had 28 potatoes! The bushel basket containing the smallest of these contained only 36 potatoes." Engle also reported harvesting Hubbard squash that weighed 33 lbs. apiece, and pumpkins up to 46 lbs. (Plate D shows one of the big ones in the "making.") "Twenty years ago," continued Engle, "we couldn't grow squash at all in this area because of the squash borer. Today there are no borers on our farm, and no controls are used. In harvesting we found from two to five earthworms under each squash." Which all goes to show what biological soil building will do.

"To convince a few skeptics, among whom was the Manager of the Occidental Hotel in Muskegon we exhibited medium clover 74 inches in height," continued this enthusiastic farmer, "and our total salable crops amounted to $12,000.00! What a record to chalk up against the dire predictions of the "experts"!

O yes, I forgot to tell you that son Edward is now a full-fledged member of the firm, and shares the profits of this one-time "no-account" farm with his dad. In Plate E you will find father and son exhibiting their prize possession—a 7½-year-old rubber plant. The lower half represents 7 years of growth before the Engles acquired it. The upper half represents 6 *months' growth* with the help of "Cin-A-Gro" the Engles' own registered brand of organic fertilizer. Wouldn't you, wouldn't we *all* like to know that secret formula! Look at the size of those leaves developed with "Cin-A-Gro"!

Another real thrill came when I inadvertantly dug my heel into that sandy loam out in the melon and squash patch. Mind you, it hadn't rained for over five weeks. Drought conditions had resulted in serious losses on adjoining farms, which were drying up. But on the Englewood Farm—the Organic Farm—everything was in the "pink." And you can well imagine my surprise when I noticed *damp earth* where my heel had uncovered the thin dust mulch, for actually one-half inch under the surface of that dry, sun-drenched soil it was wet!

PLATE F

Wet enough to make a mud ball if you please. I immediately brushed off the thin layer of dry sand, and took a picture of the dark, damp earth thus uncovered. (See Plate F.) "Unbelievable," you say. Must I again remind you that my camera doesn't lie? Look! You can see for yourself.

What further PROOF do we need to confirm the rightness of these heaven-born principles of maintaining soil fertility? When the neighbors' corn fields are drying up or riddled with the corn borer and other pests, and yours are standing up and free from all types of infestation; when other soils are parched and dry, while yours is mellow and full of life-sustaining moisture; when your potato plants in rows four feet apart fill up the row completely with foliage, and bear crops of gigantic proportions, while the neighbors are seared and spindly—what argument can the proponents of artificial, shot-in-the-arm methods bring to destroy your faith in Nature's own way of maintaining absolute soil fertility? As for me, it's Q. E. D. In other words it's *conclusive proof*, nothing more or less.

ORGANI-CULTURE

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# BOTANY
## for the Organic Gardener (9)

By DR. WILLIAM H. EYSTER

### Plants In The Soil

### ACTINOMYCES

THE soil is, as we have seen, a vast culture medium in which organic matter serves as the foods of the soil organisms. The abundance of the soil organisms is in direct proportion to the amount of organic matter in the soil when other conditions favorable to growth are met. However, soil organisms of all kinds appear to be present in the soil in greatest numbers in the spring time and again in the fall. Winter is for soil organisms, as for most organisms in many parts of the earth, a period of suspended activity and rest due to the low temperatures which then prevail. In the spring, when the temperature rises and becomes favorable to the life activities of organisms there is a marked acceleration in microbial development. In summer soil organisms usually become somewhat less active due to diminished supplies of water, and fluctuate in response to changes in the soil brought about by rainfall, plant growth, and cultural practices. Soil organisms reach a second peak in growth and reproduction in the fall in response to the fall rains and the incorporation in the soil of considerable amounts of organic matter which represents the plant residues after the harvests have been collected. The accumulation of these plant materials on the soil serves as a mulch which prevents the loss of moisture from the soil and also serves the soil organisms as foods.

We have already noted that the most abundant group of organisms in the soil are the bacteria which exceed both in numbers and in variety of their activities all the other soil organisms. It is not exceptional to find hundreds of millions of bacterial cells in a pinch of soil rich in organic matter. Associated with the bacteria in the soil is another group of plants which are less numerous and less understood, but equally important soil plants known as the *Actinomyces*. The actinomyces are more commonly known as "ray fungi," or as "thread bacteria." The plant body consists of a series of bacteria-like cells joined end-to-end to form a usually branched mycelium. These cells are as small in cross section as bacterial cells, and it is for this reason that the plants are called "thread bacteria." The extremely slender hyphae exhibit true branching, as in the higher fungi. The mycelium is apparently not segmented, and the cells do not contain a regularly organized nucleus and in these respects the thread bacteria or ray fungi differ from the higher fungi.

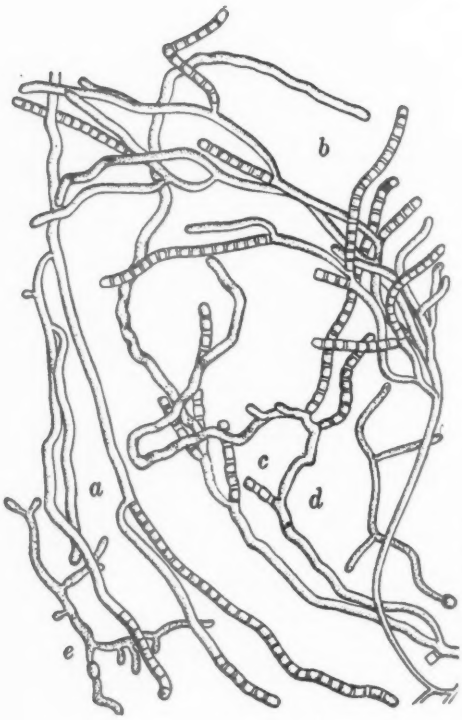



FIGURE 23

Branching mycelium of Actinomyces. *Actinomyces griseus,* with a short mycelium and abundant branching: a, b, c, portions of aerial mycelium; d, e, spores germinating with one and two germ tubes respectively (from Drechsler).

The ray fungi are made up of cells like bacteria which are joined together to form a mycelium as in the higher fungi. Many botanists regard the ray fungi as intermediate between the bacteria and the higher fungi. The ray fungi reproduce by fragmentation, in that the mycelium breaks up into its individual cells which then are indistinguishable from rod-shaped bacteria. Each of these cells is capable of growing into a new plant.

The actinomyces or ray fungi are relatively abundant in the soil, and make up from 10 to 60 per cent of the colonies of soil organisms on culture plates prepared from soil samples. They are restricted almost entirely to the soil and do not have motile organs of any kind. As a matter of fact, they are especially equipped for growth on solid surfaces which are exposed to the air. With few exceptions, they are aerobic, meaning that they can live only in the presence of oxygen from the air. They can get along with much less moisture than is required by bacteria and prefer a neutral or slightly alkaline soil. The ray fungi decompose such organic substances as cellulose proteins, fats, starches, acids including carbolic acid, rubber, and lignin. They give off a volatile substance which gives to the soil the odor which we associate with fresh earth or leaf mould.

Many of the ray fungi produce antibiotic substances—substances which are antagonistic to and inhibit the growth of other soil organisms. Since ray fungi grow abundantly in normal soils, it is possible that they play an important role in maintaining a healthy balance of organisms in the soil. Rosenthal* isolated a ray fungus which is the antagonist of the diph-

theria organism. Others have been found which are antagonistic to other disease-producing organisms. A ray fungus belonging to the genus *Actinomyces* is the origin of the recently discovered antibiotic called *actinomycin* which is being used with such success in the control of bacterial infections of the human body.

The ray fungi are of especial importance to the gardener and farmer because they are the most important organisms in the compost heap in that they attack many organic substances which are not readily decomposed by other organisms. When the heap becomes too dry for the bacteria, the ray fungi tend to take over and carry on the work of decomposition of the plant and animal residues. The ray fungi may be even more important in maintaining the healthy balance of the organisms in the soil. They eliminate from the soil disease-producing bacteria and fungi. Organisms in the soil which grow out of bounds and thus upset Nature's balance usually assume the parasitic mode of life and attack the roots of higher plants. This type of unbalance is well illustrated in the nematodes which often, as a result of bad agricultural practices, become epidemic in the soil and cause such diseases as clubroot of cabbage and other plants.

Definition of Terms

*Mycelium* — The white, thread-like filaments made up of an end to end series of cells which make up the plant body of a fungus is called a mycelium. The white mold on bread or other food material is an example of a mycelium.

*Hypha* — A single filament of a mycelium is called a hypha.

*Segmented* — A filament or hypha which has cross partitions is said to be segmented. When no cross partitions are present it is called nonsegmented.

*Fragmentation* — The breaking up of a plant body into smaller pieces is called fragmentation.

*Aerobic* — Said of an organism which requires oxygen from the atmosphere.

*Cellulose* — Is the material which makes up the cell wall of non-woody plants.

*Lignin* — Is the material which makes up the cell wall of woody plants. Sawdust is made up largely of lignin.

*Antibiotic* — A substance which antagonizes or inhibits an organism.

* Rosenthal, L. La Lyse des Bacillis diphteriques effectuee par un streptrothrix. Compt. rend. Soc. de biol. 93:77-78 (1925).

(EDITOR'S NOTE: The next article will be concerned with the higher fungi.)

## *Crab Grass*

At least in the northern parts of the United States crab grass is an annual and passes through the winter in the seed stage. The seeds do not germinate until May or June. To control crab grass, sow white clover any time after March 1 and have an established stand on bare spots before the crab grass has a chance to develop.

# *Double Chrysanthemum-flowered Sunflowers*

By CHARLES V. APPLEGATE

DOUBLE chrysanthemum-flowered sunflowers are as decorative as they are unusual. Each flower is made up of thousands of petals, and seems to burst-out from the center. If you have never grown or seen these sunflowers, a pleasant surprise is waiting for you.

Visitors who looked at our garden from the living room window, always noticed a row of double sunflowers. These seemed to be the greatest attention-getters in the whole garden. People would exclaim that they looked just like gigantic marigolds or mums, 6 feet tall! Friends said that they knew what compost and mulching *could* do, but they had never seen anything like this. These were merely double chrysanthemum-flowered sunflowers, but few people had seen them before.

These sunflowers grow to a height of six or seven feet. The first flower to open is the one at the top of the stalk. It is from six to eight inches across and is usually the largest on the plant. Soon other flowers open below this one and continue down the stalk. The flowers last as long as any other sunflowers, and make good cut-flowers, especially for baskets. By the time the last flowers (which are quite small, about 2 inches) open, the first flower is beginning to fade.

It is best to leave some of the largest flowers for seed. The seeds in these heads will be larger. The heads should remain on the plants until they become brown. If it is late in the season and the heads are not ripe, the entire stalk can be cut and brought indoors to ripen. After harvesting, when the heads are thoroughly dry, they should be shelled. The heads are usually very full of seeds. It seems as though every petal has a seed. The heads from eleven plants, some of which had been used as cut-flowers, yielded me nearly three quarts of seeds! And that's a lot of seeds, for these seeds are just about half as large as large-flowered sunflower seeds. It takes very few seeds to produce a lot of plants. If you have extra seeds, they can be used as food for birds during the winter.

For a good succession of bloom, marching across the garden, it is necessary to make several sowings. The first one should be made early in May, and will bloom by mid-August. A second and third should be made two or three weeks apart. The time of sowing and maturity will vary with different sections and different seasons.

If you like sunflowers, by all means try these doubles that make such good, and unusual cut-flowers.

# NO DIGGING

Reprinted from *Mother Earth*—Autumn, 1947

By LADY EVE BALFOUR

HUMAN nature being what it is, there is always a certain satisfaction in confounding the experts. I observed something of this satisfaction among the four no-digging pioneers whom I visited last spring and summer, which was highly understandable under the circumstances, because in the words of one of them 'the results literally have to be seen to be believed.'

Of course time may modify their present opinions. All of them would agree that their technique is new and experimental; but what interested me so much was the nearly equal success achieved by four quite different methods, the only common factor being that in all cases the natural layering of the soil was not interfered with.

My first visit was to 'Rab's Corner,' the Hertfordshire garden described in John Wynden's special article in the Harvest number. I need not describe it again here except to say that I was so much impressed by the action of the 'Fulcrum Fork' that I promptly bought one myself and have since introduced it to several grateful friends. Three things struck me most forcibly at Rab's Corner: (1) the exceedingly healthy appearance of all crops; (2) the excellence of the weed control, and (3) the texture of the surface soil; no one would suspect by looking at it that it had not been dug and forked and raked in the conventional way.

My next step took me to the Sussex garden belonging to Dr. Langley Owen. He is experimenting with different methods and will, I hope, give us the results in due course for publication in *Mother Earth*. When I visited him he had heaps of compost all over the garden and was using it as a fairly thick layer spread on land not even loosened with a fork; weeding was done by hand and all weeds composted. My visit coincided with the soft fruit season, and I have literally never seen larger, or tasted sweeter, berries; but the greatest surprise was carrots and potatoes looking (in the drought year) more forward than any I had seen anywhere, the former sown in compost on undisturbed soil and the latter dibbled into holes made in compost-covered solid land following a brussel sprout crop. Dr. Langley Owen had just begun experimenting with sawdust, spreading it on the path to weather before using it on the beds.

My next visit (at the end of August) was to Mr. Bagot's famous and beautiful Levens Hall gardens with its exquisite clipped yews dating from the 13th century. This is where the sawdust experiments are proceeding under the direction of Mr. F. C. King. Mr. King is a great believer in treating cultivated land with large quantities of coarse woody material. Quite large sticks and branches go into his compost heaps, and big wood chips as well as fine sawdust go direct on to the land. Weed control in the case of this garden is achieved by smothering with sawdust up to a depth of 6 inches. I have yet to be convinced that it will prove wise to go on using sawdust at this rate; but that our soil fertility was created by the forest and that it has been too long without the byproducts

of the woodland is true enough. I am convinced that some very interesting and useful knowledge will emerge from the Levens Hall experiments. Already Mr. King believes that to leave the soil undisturbed under fruit trees renders them immune from the sucking pests. Concerning speedy growth, the following result with winter lettuces is very striking. Two long beds—both composted, but one dug and one undisturbed—were planted out in August with lettuces sown in July. In the undisturbed bed, the first cut was taken in October, another in December and a third in April; in the dug bed the first cut was not ready until March.

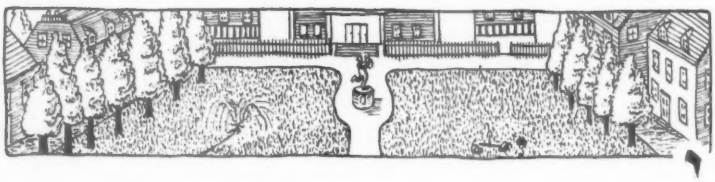
On my way home from Kendal I visited the fourth no-digging garden—a small garden, on difficult soil in the middle of a mining district near Sheffield, where Mr. Guest, the owner, can be justly proud of his achievements.

For two years this garden has felt neither spade, fork, nor hoe! But it might be a show garden for the quality and quantity of its crops and the cleanness of its beds—not a weed is to be seen. Mr. Guest makes large quantities of compost, using (besides his own crop residues) straw, sawdust and sewage sludge from the local sewage farm. Because he does not need to dig and hoe, all his energies can go into his compost making, and the compost I saw was certainly of a beautiful quality and sweet as a nut. This compost is spread thickly on the undug bed, the seeds are sown on it and then covered up with a second layer of compost (in the case of the very fine seeds the compost is sieved). I saw a heavy crop of prizewinning potatoes of excellent shape and splendid skins grown in this way, and carrots 14 inches long of perfect shape and without a blemish. Sweet peas had been seven feet high and had won prizes at many local shows. Roots, brassicas and tomatoes were all up to the same high standard.

I confess freely that I am one of those who had to see to believe. Yet why do we find it so surprising? The plant growth of natural undisturbed vegetation is nearly always healthy and vigorous and productive; yet Nature does not invert the soil. She keeps the top soil on top, and adds a layer to it each year in the form of leaf-fall and other decaying vegetation. This is gradually drawn down by earthworms and the lower levels gently deposited by them on the surface again, but the layers are never rudely turned upside down. Earthworms and deep-rooting plants provide the necessary aeration. Why should not this apply equally to cultivated plants?

## *Kodachrome Slide Library*

We invite our readers to help us build a library of colored slides of gardens, garden and farm activities, and organically grown flowers, vegetables, and fruits. We will pay $1.00 for each 35 mm. slide and proportionately more for the regular lantern slide size for all slides accepted for the library.



# Garden Calendar — July

## THE NORTH AND EAST

This is the time to evaluate your spring garden and make plans for the year ahead. Your activities in July will determine the effectiveness of your garden operations this fall and next spring. Also take time out in July to enjoy your garden. It is so easy to spend all one's time in planning, planting, and maintaining the garden that no time is left for the aesthetic and spiritual values.

*Flower Garden.* Continue pinching off the lateral shoots of the chrysanthemums and dahlias if you want fewer but bigger flower heads. Delphinium, bachelor's button, and phlox should be cut back near the ground to induce new growth for fall flowering. Also cut back violets, forget-me-nots, and nepeta to four inches. Hollyhock and veronica will bloom a second time if the old flowers are removed so that they do not develop their seeds. Keep the old flowers cut from baby rambler roses to keep them blooming all summer. Pinch back boltonia and hardy asters early in July to keep them bushy.

If your borders are lacking in color, interplant your border plants with coleus, pelargonium, and begonia. Annuals may still be planted in July such as lupines, balsam, portulaca, Shirley poppies, torenia, zinnia, godetia, Drummond's phlox, mignonette, and Virginia stocks. Make another planting of gladiolus for fall blooms. Columbines may be seeded in the coldframe. Do not be discouraged if the seedlings do not appear for a month or more, as the seeds germinate quite slowly. Also sow seeds of foxglove and Canterbury bells.

July mulching controls weeds and pays big dividends in better fall flowers. Peonies will profit from a liberal application of compost. Cosmos will appreciate a light sprinkling of wood ashes just as they are coming into flower.

The perennials should be staked before the plants break down under the weight of the flower masses. Order your bulbs now for fall planting. Old lily-of-the-valley beds should be renewed. Remove the old plants, enrich the soil with compost, and reset the bed with new pips which should be planted in small bunches.

*Shrubs and Trees.* Roses should be examined for sucker shoots which should be removed. The wisterias should be given a heavy pruning. See that your spring-planted shrubs and trees are well mulched. Water them if necessary.

*Vegetable Garden.* Plant vegetables for fall use—cabbage, endive, carrot, beet, Chinese cabbage, peas, potatoes, celery, lettuce, sweet corn, spinach, and others that will provide food for the table before winter.

## THE WEST COAST

*Flower Garden.* This is seed sowing time for pansies and violets. Other seeds that may be sown now are calendula, centaurea, clarkia, cynoglossum, dimorphotheca, scarlet flax, godetia, larkspur, Iceland poppy, linaria, nemesia, schizanthus, snapdragon, winter stock, and winter sweet pea.

If your July garden lacks color, now is the time to plan the improvements for next year. Some suggestions are Leucophyllum with silvery foliage and soft pink flowers, Nerine which also has pink flowers, and the blue-flowered Moraea.

Continue to disbud the chrysanthemums and dahlias for large heads. Lupines which are cut back immediately after flowering will make new growth and often bloom a second time. Plant the pansy beds with verbena, dwarf petunia, or annual phlox.

*Shrubs and Trees.* Rhododendrons, azaleas, and other ericaceous shrubs should be mulched with compost and leaves but never cultivated. Your annuals and perennials will also be benefited by a mulch which prevents weeds and conserves moisture.

*Vegetable Garden.* Plant vegetables for fall use including practically all salad, flavoring, and vegetable plants, and such root crops as beets, radishes, and carrots. Still time to plant sweet corn, peas, beans, and potatoes.

## THE SOUTH

The South is made beautiful in July by oleanders, crepe myrtles, hydrangeas, rose of Sharons, and magnolias.

*Flower Garden.* Hardy phlox in white and all shades of red are remarkably heat resistant and should be in every garden. Shasta daisies lighten the heavy shades of salvia and torenia. Keep all dead flowers cut off your plants to prolong the blooming period. The hardy chrysanthemums should be pinched back consistently to produce low, bushy, free-flowering plants. Be sure to have buddleias and abelias in your garden. The poinsettias should be cut back to about two-thirds their present height to encourage branching. The clipped branches may be rooted and grown into new plants for potting and growth indoors. Plant daffodils, bearded iris, madonna lily, and gladiolus. Lotus and water lilies are worth while in the pond. Make repeated sowings of annuals.

*Shrubs and Trees.* Oleander and gardenia cuttings should be made. Reproduce by layering tea olive, camellia, and the broad-leaved evergreens.

# The Soil and Health Foundation

The immediate and urgent need for the carrying on of fundamental researches concerned with the soil as the foundation of the health of all plants and all animals, including man, is emphasized by the reports in such recent publications as *Food and You, A Public Conference on Nutrition,* sponsored by the Chicago Medical Society and published by the Milk Foundation, 28 East Huron St., Chicago, Ill.; *Health From the Ground Up,* International Harvester Company, 180 N. Michigan Ave., Chicago, Ill.; and *A Symposium on the Effects of Soil Elements on Food,* Florida State Department of Agriculture, Tallahassee, Florida. Every person who is interested in his own health, and that means everybody, should read the reports in the above and similar publications to become fully aware of the importance of the proper growing of the foods for ourselves and for our food animals and food plants. We should know that the depleted soils in certain areas of the country were responsible for the rejection of approximately 70 per cent of the young men as physically unfit for military service. In other areas where the soils are less depleted, only about 30 per cent of the draftees were rejected. We should know and clearly understand that depleted soils can at best grow only plants that are deficient in the same elements which are deficient in the soil. Such deficient food plants, when used by animals and man as foods, pass on their deficiencies to be expressed in animals and man as degenerative diseases.

Soils which are deficient in essential minerals, even though they be trace elements which may be required in such small amounts that one part in a million or even ten million are sufficient, cannot produce the foods that are necessary for insuring the best health possible within the limitations of our heredity. Soils which are unbalanced as a result of adding the highly soluble, artificially made or synthesized chemical fertilizers can support only nutritionally unbalanced food plants and grazing animals. This unbalance in the food plants usually results in the production of plants which are too high in carbohydrates (sugars, starches, celluloses) and too low in proteins because the minerals for converting the carbohydrates into proteins are not available in the soil or in the plant. The carbohydrates are often referred to as "go-foods" while the proteins are called "grow-foods." The higher plants are in carbohydrates the more palatable they become to insects and fungus diseases and the less nutritious they are to the higher animals. As foods such mineral-deficient, devitalized plants fail to satisfy the natural appetite of animals and leave them with a *hidden hunger* which encourages over-eating and results in oversized bodies. Not infrequently animals which feed on plants grown in depleted soils have such poorly developed skeletal systems that they collapse much like an old building in which the frame timbers have rotted out.

The Soil and Health Foundation has plans for laboratories for the scientific study of soil practices in relation to all aspects of agriculture, but with special emphasis on the soil in relation to the health of man. We welcome contributions from all who want to have a share in conserving our soils and our health. Upon these depends the continued existence of our civilization.

Contributions may be sent to the Secretary, Soil and Health Foundation, 46 South West Street, Allentown, Pa.

# ORGANIC GARDENERS' DIGEST

By DR. WILLIAM H. EYSTER

## COPPER SULPHATE KILLS SOIL ORGANISMS

According to an article in the *Contributions From Boyce Thompson Institute,* for January-March, 1948 copper sulphate is so toxic that the germination of spores of certain fungi is completely inhibited by only 10 parts of it in one million parts of water. Copper sulphate is one of the most commonly used ingredients of fungicides with which our food plants are sprayed and dusted. If such minute amounts as 10 parts of copper sulphate in one million parts of water completely inactivate the spores of certain fungi, what, we may ask, will it do to the beneficial fungi and bacteria in the soil as it drips from the newly sprayed trees. The soil under a tree that has been sprayed from 5 to 20 times during a single growing season is apt to be quite dead, and such soil cannot maintain a fruit tree in a healthy condition. Is there any wonder that more and more sprayings are necessary to prevent the fruits as well as the trees of an orchard from being completely ruined by pests? Would it not be better to work with rather than against Nature? Why not mulch the fruit trees heavily with compost and green matter and maintain the fruit trees in such good nutritional balance that they will be naturally resistant to diseases and insect pests?

—o—

## MINING THE SOIL WITH CORN

According to a recent issue of the *Wall Street Journal,* American farmers will use between 18 and 20 million tons of nitrates, phosphates, and potash this year with a much larger portion than ever before for corn. The hybrid corns which are now being used are heavy feeders, produce more ears than ordinary corn, but also take more out of the soil. High prices are given as the incentive for producing bigger crops. State agricultural colleges, county agents, government experiment stations, local bankers, and even farm equipment makers are preaching the gospel of more fertilizers for bigger crops. Recent government studies show that using artificial fertilizers increases the average yield of corn per acre, but they do not tell the farmer what these fertilizers do to the soil. What they do not tell the farmers is that highly soluble commercial fertilizers stimulate the soil organisms to such great activity that they use up the organic matter in the soil for food faster than present agricultural practices can possibly return it to the soil. The result is that although for a number of years bigger corn crops will be harvested, the organic matter in the soil is being consumed and decreased so that after a few years the soil will not respond to fertilizers because the humus will have been burned out of the soil. The increased use of artificials for growing bigger crops of hybrid corn will mine the humus out of the soil more quickly than any other way that I can think of at the present. It represents a short-sighted policy so far as the soil is concerned, and is based on a money economy. It means extra dollars to the fertilizer companies, extra dollars to the farmer for a few years or

until the humus has been exhausted, and a depleted, unproductive, eroding soil.

—o—

## PLANTS PREFER PHOSPHORUS ORIGINATING FROM PARENT ROCK

According to the April 11, 1948 issue of the *Chicago Tribune* a Canadian scientist is doing research with phosphate fertilizers which may eventually save United States and Canadian farmers $100,000,000.00. The scientist here referred to is Prof. J. W. T. Spinks of the University of Saskatchewan, a senior member of Canada's war time atomic energy research staff. Last year American and Canadian farmers bought and applied about 8,000,000 tons of superphosphate at an approximate cost of $200,000,000. According to Prof. Spinks, only about 25 per cent of this fertilizer was actually taken up by the plants, the rest lying useless in the soil. He also reports that the old-fashioned methods of determining the uptake of fertilizer are in error by as much as 40 per cent. Even more significant is his finding that the additional phosphorus found in artificially fertilized plants did not necessarily come from the fertilizer at all, but from the original element in the soil.

—o—

## CERESAN POISONING OF SWINE

The use of grains treated with Ceresan (ethyl mercury phosphate) as feed for animals is often false economy. Diagnoses of mercury poisoning are made each year on specimens of swine and chickens which have been submitted to this laboratory.

K. B. Middleton has recently described acute, fatal poisoning in cattle that had eaten oats treated with Ceresan. In contrast to the acute condition described by this investigator, most of the cases encountered here have been of a chronic type.

—*Bimonthly Bulletin, North Dakota Agricultural Experiment Station.*

## EFFECT OF MANURE ON CROP YIELDS

Yield response to barnyard manure has been much greater than to green manure. Straw and stover yields in rotations receiving manure were significantly higher than the checks. Corn stover yields were greatest the years immediately following the application of manure. With the exception of corn ear yields the application of manure has resulted in substantial increases in yield the past few years of ample rainfall. Manure has reduced yields in some years of low rainfall resulting in lower average yields on manured plots. On the average, the return from manure has been worthwhile and by maintaining the fertility, gives promise of greater returns in the future over rotations receiving no amendment.

—*Bimonthly Bulletin, North Dakota Agricultural Experiment Station.*

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## SKUNKS AND INSECTS

William T. McKean, assistant field biologist of the North Dakota Game and Fish Department trapped and examined the stomachs of 585 predatory animals including 103 skunks. He found in the skunks studied that 64 per cent of the volume of their food consisted of insects, of which 60 per cent were grasshoppers. There was, on the average, 28 grasshoppers in the stomach of each skunk observed.

—*Bimonthly Bulletin, North Dakota Agricultural Experiment Station.*

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## NEW STRAWBERRY

Fairland, a new, early, red-stele disease resistant strawberry variety adapted for growing in the northern states, was recently introduced by the U. S. Dept. of Agriculture and the University of Maryland. It ripens at about the same time as Fairfax and Catskill.

—*Horticulture,* January, 1948.

*THREE IMPORTANT BOOKS BY EXPERTS —OF GREAT VALUE TO THE GARDENER AND THE FARMER—*

## Farmers Of 40 Centuries, *by* F. H. KING, D.Sc.

*formerly Professor of Agricultural Physics, University of Wisconsin; and Chief of Division of Soil Management, U. S. Dept. of Agriculture.*

Compost and compost only is the key to the problem of sustaining the fertility of the East—an East that has never succumbed to western substitute principles of chemical shots-in-the-arm for depleted farm lands. Compost fertilization has been the salvation of the Chinese, Japanese and Korean farmers, compelled for centuries to wrest their pitiful living from inadequate land. But they have managed to do it and Dr. King travelled in their countries, studied their methods and wrote this important book about his observations. He discusses their thousand and one ways of making compost, their methods of returning to the soil all that has been taken from it, and concludes that we must adopt some of the same techniques if we are to survive. Our own soil is fast losing its virility because of extended waste and pillage. Taxed to its uttermost to feed the whole world, it will surely become sterile unless we take advantage of Dr. King's suggestions. Cloth. 384 pp., 209 illustrations from photographs. **$5.00.**

## The Earth's Face And Human Destiny,

*by* EHRENFRIED PFEIFFER, M.D.

*international authority on Biodynamics*

For good or ill, Man changes the face of the land he occupies. He breaks biological laws, disturbs the earth's cycles and equilibrium, and seems almost totally ignorant of the earth's habits. Down through the ages, wherever the human race has penetrated, it has ravished the virgin soil and rendered it unproductive. Now Man stands at last at the Western terminus of his age-old trek, viewing the last fertile remnants of earth. The earth **must** be kept healthy if he, his country, and the world are to escape starvation and extinction. Man must learn, and learn fast. He must emerge from his ignorance and maladjustment and set up a healthy, natural world before it is too late. Cloth: 60 illustrations, frontispiece in 4 colors. **$2.75.**

## Trees and Toadstools, *by* M. C. RAYNER, D.Sc.

An enchanting book that will help you gain a better understanding of how toadstools and mushrooms live, grow and behave. Miss Rayner, whose field of research is with fungi, mushrooms, molds, yeasts, etc., draws attention to a regularly occurring phenomenon of our woods and pastures and reveals one of the most remarkable associations in Nature between trees and toadstools. To understand this fascinating partnership between green and non-green plants is to understand gardening better. 122 pages. 18 full-page illustrations. Cloth. **$2.50.**

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OUR LIVING FORESTS by Joseph T. Hazard (Superior Publishing Company, Seattle, Washington.) 1948. $4.00.

This is an enlightening story of the wasteful methods of logging in the past, the rape of our forests, the rifling of a continent by a relatively few timber barons. Yet even now a modern struggle as epic as any in the past is going on within the lumber industry. It is a struggle to bring intelligence, knowledge, order, farsightedness to a phase of our national existence that was often intolerant of interference. The author has written not from old documents and monographs but from vivid, personal knowledge of the situation as it now exists. He understands the life of the forest and shares his love of wild life and nature with his readers.

FARMERS' HANDBOOK—Eastern States Cooperative, 1948 (Eastern States Farmers' Exchange, Inc., West Springfield, Mass.) 1948.

This is a handbook of ready information on many of the most important aspects of general farming including feeds, dairy and stock feeding, poultry feeding, field seeds, vegetable seeds, potatoes, farm supplies of all kinds, and helpful suggestions. The book contains 461 pages and has an index that enables one to find quickly the desired information.

MALABAR FARM by Louis Bromfield (Harper & Brothers, New York City, New York.) 1948. $3.75.

Malabar Farm is a combination journal and story of the planning and carrying out of the plans that led to the reclamation of a number of abandoned farms. The author has, for the most part, returned to a simpler and more natural method of farming. To the extent that he has done this, his efforts have been richly rewarded. Unfortunately he advocates the use of artificial chemical fertilizers to restore to soils the elements which have been leached out of them, when the deficiencies can be replaced so much more safely and cheaply by applying such natural sources as pulverized limestone rock, pulverized phosphate rock, pulverized rocks with any of the other essential element, bone meal, and compost. Too often the artificials

contain N, P, and K with few or no trace elements.

The story of the farm pond is delightful and rightly emphasizes the importance of clear streams to fish populations. Without doubt, grasses are the most important plants in the earth's green carpet and are the most important sources of foods. Mr. Bromfield seems to have made an honest attempt to analyze the organic-chemical fertilizer feud but has frequently misquoted "the fanatic advocates of the organic material school."

THE AMERICAN FARMER by Lee Fryer (Harper & Brothers, Publishers, New York, New York.) 1947. $3.00.

This book tells in a very interesting manner the story of the declining opportunity and the mounting difficulties which threaten the more or less complete elimination of the small farmer from our economy. It is a presentation of the author's experiences as seen anew in the light of modern trends. Finally the author projects the attention of his readers into the future and shows them a long-range charter by which rural life in the United States may be reconstructed.

OUR PLUNDERED PLANET by Fairfield Osborn (Little, Brown and Company, Boston, Mass.) 1948. $2.50.

The author asks his readers to look back into the past to the beginnings of the earth, of plants, of animals, and of man. Although man has but recently emerged, he has wrought great damage on the earth's surface. By his intelligence, man has conquered time and space; by his stupidity he has wasted our natural resources. He is now increasing in numbers to such an extent that the various people are jostling for space and for the remnants of our resources. Man has become the mighty geologic force and a plunderer of the land.


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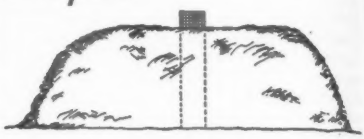

Compost is a formulated fertilizer which must be made with a certain amount of care and precision. The materials necessary for making compost include plant residues, fresh manure, soil, pulverized limestone, water, air, and the living organisms which transform these materials into compost. Last month the compost clinic included a somewhat detailed discussion of the plant residues, or green matter as they are often called. In this clinic we shall devote some attention to the manure as an essential part of the compost heap.

Manure as used in this clinic refers to the excreta and urine of animals mixed with such plant residues as are used for bedding the animals. The dung of animals consists chiefly of the undigested portions of the food, which, however, have first been ground fine by the teeth, and later saturated and softened by water taken by the animal and by the digestive juices of the alimentary canal. The undigested portions of the food consist largely of the woody or fibrous tissues of the food eaten, but the dung which contains this undigested fragment is in a much better condition to act as a manure than the original material, because it has been ground so fine and softened so much that it will be decomposed quickly by the soil organisms. Dung contains approximately one-third of the total nitrogen, one-fifth of the total potash, and nearly all the phosphoric acid voided by the animal. The nutrients in manure are

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## THE SOIL AND HEALTH

*by Sir Albert Howard, C.I.E.*

Food problems have their beginnings as soil problems, and can only be solved by an understanding of soil fertility. Sterile soil cannot produce food, and man cannot exist without being fed. So it is essential for mankind to learn how to maintain fertility and to learn how to re-create it when it has been destroyed. Everything civilization has accomplished so far has been based upon exploitation, first of the earth itself and then of its peoples. Industry and trade have had a way, all too often, of developing into banditry. Sir Albert Howard thought so, and while he was no Jeremiah, he did see clearly that mankind was poised on the verge of failure. He proved his theories, because he was not only a scientist but a practical farmer. This book deals specifically with crops and livestock, includes an illuminating history of agriculture and ends with a list of farming practices to be avoided. Cloth. 320 pp. $4.00.

## THE EARTH'S GREEN CARPET

*by Louise E. Howard*

Lady Howard is the widow of Sir Albert Howard, the founder of the Organic Farming movement. She has made herself an authority on agricultural problems and tells in this book of her theory that degenerative diseases are on the increase all over the world due to our shot-in-the-arm chemical fertilizing methods of growing the food we eat. Naturally, she advocates the adoption of Sir Albert Howard's theories and stresses the fact that Man's health and happiness depend upon the use he makes of THE EARTH'S GREEN CARPET. The book is vividly written, and the scramble for life of all growing things is graphically set forth. Nature holds everything in place if Man permits her to, but when his depredations are successful the precious top-soil is lost and blows across the land or washes downstream. Lady Howard warns us that it is almost too late, and that if we do not change our methods Man can easily vanish from the face of the earth. A Rodale Press book. Cloth. 260 pp. $3.00.

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insoluble and become available only after they are conditioned by soil organisms. It is for this reason that fresh manures should not be used directly as a fertilizer for growing plants. Most of the nitrogen and potash in manure is supplied by the urine. Whether manures are high or low in minerals depends upon whether the animals have eaten foods that were high or low in minerals. Manures from animals that eat foods grown in depleted soils are deficient in minerals, while the manures of animals which eat foods grown in fertile, complete soils contain many of the trace elements in addition to the big four, N, P, K, and Ca.

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tent of some common manures are shown in the following table.

| Kind of Manure | % Water | % N. | % P. | % K. |
|---|---|---|---|---|
| Horse | 76 | .005 | .0035 | .003 |
| Cow | 84 | .003 | .0025 | .001 |
| Swine | 80 | .006 | .0045 | .005 |
| Sheep | 58 | .0075 | .0060 | .003 |
| Hen, fresh | 56 | 1.60 | 1.7500 | .850 |
| Hen, dry | 8.35 | 2.13 | 2.0200 | .994 |
| Duck | 56 | 1.00 | 1.4000 | .620 |
| Goose | 77 | .55 | .5400 | .950 |
| Pigeon | 52 | 1.75 | 1.7500 | 1.000 |

From the above table it may be seen that poultry manure is higher in the major elements than that of the other animals listed. In building a compost heap the six inch layer of plant residues is overlaid with a layer of manure which should be two inches thick except for poultry manure which should be only one inch thick. Then sufficient water is added to give the plant material and manure the approximate water content of a squeezed sponge.

If it is not possible to get fresh manure for the compost heap such substitutes as dried blood, fish scraps, tankage, hatchery wastes, bone meal, dried ground fish, feathers, hoof and horn meal, and similar animal residues may be used.

## *Compost Correspondence . .*

### SUBURBAN COMPOSTER

*Q.* Could I make a compost heap in a new galvanized garbage can? I have only a small backyard and not much room.

C. N. D., Wilmington, Del.

*A.* A garbage can can be made into an ideal composter. Punch holes in the bottom and in the sides as well as the lid. Place about 4 inches of fertile soil in the bottom of the can. Then layer your materials in the same way as for a large heap in the garden. Such a composter is not objectionable even in the best residential parts of the city. If desired, plants can be grown and trained over the can so that it becomes converted into a mound of green leaves.


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## SOIL IN THE COMPOST HEAP

*Q.* What is the purpose of soil in the compost heap and how is it correctly used?

K. C., New London, Conn.

*A.* Soil serves as a base to neutralize acids and to absorb the volatile decomposition products. Each layer of the compost heap should have a soil cover not to exceed one-eighth of an inch in thickness. This is hardly more than a film of soil, but it is exceedingly important. Too much soil in the heap interfers with proper aeration and greatly slows down the rate of decomposition. Making a compost heap is simple indeed, but it is extremely important that it be formulated with as much care as the baker uses in making a choice cake. An improperly made heap usually results in only partly decomposed plant and animal residues. Such incompletely made compost lacks some of the "plant magic" inherent in properly made compost.

—o—

## DIFFERENT COMPOSTS

*Q.* Are all composts of equal value as organic fertilizers?

P. E. S., San Antonio, Texas.

*A.* All composts add to the soil the much needed organic matter, but differ in plant nutrients according to the plant and animal residues used in making the compost heap. To make compost having the highest fertilizer value it is well to collect a wide variety of plant materials from different sources, including leaves of deep-rooted trees.

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The ORGANIC GARDENING Magazine does not accept advertising of chemical fertilizers or other fertilizers which we feel are too strong for the land or poisonous sprays. We do not deny firms access to our advertising columns if they handle chemical fertilizers if they have another acceptable product to sell. The reader should be careful in accepting such advertisements. Our responsibility extends only to the product advertised in our magazine. It does not extend to all of the products handled by a concern.

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## MULCH FOR EVERGREENS

*Q.* How long should the winter mulch be permitted to remain on the soil around evergreen trees?

W. T., Perkersburg, W. Va.

*A.* It is good practice to allow the mulch to remain around evergreen trees throughtout the entire year. The mulch will be gradually converted into acid compost which is the optimum fertilizer for evergreens.

—o—

## SOUR SOIL

*Q.* I believe that the soil in my garden is sour. How can I test it, or how can I be sure that it really is acid?

A. C., Indianola, Iowa.

*A.* Certain plants are indicators of acid soil. If sheep sorrel or daisy grows in your soil you can be sure that it is sour. You can make a direct test by purchasing some litmus paper and applying it to moist soil. If the soil is acid, the litmus paper will become pink.

—o—

## SOWING LAWN SEED

*Q.* When is the best time to seed a new lawn?

R. W., Clearfield, Pa.

*A.* In the North it is best to seed

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a new lawn in August or September because grasses grow in the cool weather of fall and become well established before spring. If the lawn is to be a mixture of grasses and clover, sow the clover in the spring. A good healthy growth of lawn grasses and clover will inhibit the growth of quack grass.

—o—

## PRUNING SPRING-FLOWERING SHRUBS

*Q.* When should the spring-flowering shrubs be pruned?

G. O. B., Albany, N. Y.

*A.* All spring-flowering shrubs which bloom in early spring from buds that were produced the previous year should be pruned immediately after the completion of the blooming period. This prevents the strength of the plant from being expended in the production of seeds and fruits, and insures an abundant growth of new branches which will bear the flowering-buds for the following spring.

—o—

## ORGANICALLY GROWN SEEDS

*Q.* Are there commercial sources of organically grown farm and garden seeds? In what respects are such seeds superior to those grown in chemically treated soils?

W. R., Selinsgrove, Pa.

*A.* Organically grown seeds are available in limited amounts from individual farmers and gardeners who use the organic method but who do not commercialize their seeds. Organically produced seeds germinate better and produce healthy plants which do not "run out" after a few years. The same is true of such plants as potatoes which are propagated by tubers.

—o—

## EVERGREEN CUTTINGS

*Q.* When should cuttings of evergreens be made?

H. B., Cleveland, Ohio.

*A.* Evergreen cuttings may be made from soft wood and from mature

wood. For soft wood cuttings, immature twigs should be cut in July and stuck in sand in a coldframe. It is more satisfactory to make cuttings from mature wood cut any time during November or December. Such cuttings should be stuck in sand in a greenhouse.

—o—

## SLUGS IN MULCHED PLANTS

*Q.* I am in agreement with those who claim a mulch cover is excellent for maintaining the condition and moisture in the soil. But how do you control slugs in mulched strawberries and tomatoes?

R. E. P., Summit, N. J.

*A.* Slugs can be discouraged by sprinkling over the mulch dry wood ashes or slacked lime.

—o—

## FLIES IN GARBAGE

*Q.* I would like to save my kitchen garbage for a compost heap, but even in a tightly covered can it becomes a breeding place for flies. How can I prevent flies from infesting the garbage?

C. C., Jacksonville, Fla.

*A.* Flies can be excluded from a garbage can if it has a really close-fitting lid or cover. Or the garbage can be put in the compost heap daily and covered with enough soil to exclude the flies. Try placing a sheet of newspaper over the top of the can before the lid is replaced on the garbage can. Although the flies are disagreeable, they do help break down the garbage and convert it into compost.

—o—

## ROCKS FOR MULCHING

*Q.* Will any kind of rocks be satisfactory for mulching?

A. H-S., Denmark.

*A.* It is best to use native rocks of such sizes and shapes as will facilitate handling and laying down over a compost and/or vegetable mulch.


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**FOR DOMESTICATED EARTHWORMS** to build your garbage and waste materials into organic rich soil call or write **MRS. L. JONES, 1515 E. 76th, Seattle 5, Wash.**

**RAISE YOUR OWN EARTHWORMS** with stock of eggs, young worms and adults from our IOWABRED culture beds. Shipped postpaid including instructions $1.00. **IOWA EARTHWORM HATCHERY, Council Bluffs, Iowa.**

## FERTILIZERS—SOIL CONDITIONERS

**COLLOIDAL MINERALS FOR SOIL & COMPOST.** Contains over twenty elements. You can plant seeds in it. Send $2.00 per 100 lb. F.O.B. **"BRABON" Research for Health, Telford, Pa.**

**JERSEY MOSS—large bales—$2.80 a bale burlapped. Not** burlapped $2.50. **SYLVESTER BARONE, Elwood, N. J.** Phone 1902 **Egg Harbor.**

**POULTRY MANURE:** 100 lbs. in 50-lb. bags $2.00; 500 lbs. in 50-lb. bags $9.00; 1000 lbs. in 50-lb. bags $16.00; 2000 lbs. in 50-lb. bags $25.00. **DIAMOND STATE EVERGREEN CO., Milton, Del.**

**WOOD ASHES** (Hardwood, unleached), dried blood, bone meal, fish meal. 100% organic mixed fertilizer composed only of above ingredients and equivalent to 5-10-5. **H. R. LEFEVER, R. 1, Spring Grove, Penna.**

**SCHROCK NATURAL HI-TEST PHOSPHATE** (32-34% $P_2O_5$). Prompt Deliveries. Dealers Wanted. Fertilizer Spreaders. **SCHROCK FERTILIZER SERVICE, Congerville, Illinois.**

## GARDEN EQUIPMENT

**3 YEAR GUARANTEE FLEXO RAKE** adjustable for garden or lawn. I will replace free of charge, tines damaged through ordinary use within 3 years from purchase. Swedish steel tines, width extended 24", 4 ft. handle, $2.25 each. Ask your dealer or send check or money order. Express collect. Circular upon request. **A. W. WALTER, 75 Reid Av., Port Washington, N. Y.**

Thanks for praise of WEEDING TOOLS. Only few more reserved to this advertising. Year around help. Buy while you can. Get illustrated circular first. **L. F. KRAMER CO., Enumclaw, Wash.**

## GARDEN BOOKS

**GARDEN EXCHANGE MAGAZINE**—That "biggest little" publication that features EXCHANGE! You'll like this. Sample 15c. Two years, $1.00. (Quarterly). **E. JOHNSON, 683 Nevada, Reno, Nevada.**

**"CARE AND CULTURE OF AFRICAN VIOLETS,"** Loyd Putnam Lindsey, Third Edition (enlarged). Learn secrets of experts, 50c. Safety Violet Waterer 25c (no stamps). **AFRICAN VIOLETS, Box 1666, Asheville, N. C.**

## HOME BUILDING BOOKS

**"CONCRETE BLOCK HOMES."** 32 page booklet: drawings, instructions on how to build, $1.00. **H. C. LIGHTFOOT, Civil Engineer, Richboro 17, Penna.**

## HAMSTERS

**YOU MAY NOT GET RICH** raising Golden Hamsters, but if you would like to earn $1,000 or more a year in your spare time, you owe it to yourself to find out more about this remarkable animal. Other people are making money raising Hamsters, you can too. **HAYNER'S HAMSTERY** booklet of accurate information with pictures sent free. **Dept. 5, Normal, Ill.**

## HEALTH PRODUCTS

**300 DAYS' SUPPLY OF KELP only $1.00.** Iodine deficiency may help cause goitre, excess weight. One BILDINE pure Pacific kelp tablet, daily, protects against Iodine deficiency at low cost. 300 BILDINE tablets, $1.00, 700 for $2.00. Circular free. **FOOD SUPPLEMENT COMPANY, Box 615, Williamsport, Penna.**

**ANTI-INFLATION VALUES IN "GOOD HEALTH" FOODS**—all grown, processed or prepared under "BIO-ORGANIC" principles.

1000 ALFALFA Tablets $2. (200 for trial $1.)

DEHYDRATED INSTANT VEGETABLE BROTH..$1

INSTA'CHURT (for making INSTANT sour milk)—32 cup size $1. Just add to milk.

YEAST and KELP Tablets..1000..$3.75. (100 for trial $1.) 1 or 2 tablets daily provide all the food Iodine your system needs.

Send for list of other dehydrated vegetables such as DEHYDRATED MOLASSES—rich in natural food iron.. 20 oz. Jar. $1.

DEHYDRATED SWEET BUTTERMILK—Just add a tablespoonful to a cup of water—rich in food calcium and non-fattening. 10 oz. Jar. $1. 5 lb. bulk $3.75.

BUTTERMILK WHEY POWDER—changes intestinal floras, suppresses colonic putrefaction, mildly laxative, sprinkle on cereal or take in hot water on arising—10 oz. Jar. $1. 5 lbs. $3.75.

TRIPLE SPEED FOOD LIQUEFIER....$34.00. All you do is drop bits of fruits, nuts or vegetable in a selected liquid (milk, juice, etc.) and all will come out liquefied. Refines rough pulp for more organic mineral availability.

USE THESE PROTECTIVE FOODS GENEROUSLY. THEY ARE GOOD FOR YOUNG AND OLD. All postpaid. **SCHIFF BIO FOODS, Dept. G. 3265 Joy Rd., Detroit 6, Mich.**

## MONEY-MAKING ACTIVITIES

**DISTRIBUTE SUBSCRIPTION-GETTING BOOKLETS.** Help spread the organic message. Nothing to sell. Merely hand out these booklets to likely subscriber prospects of **Organic Gardening Magazine.** Coded coupon permits us to trace source of subscription to your efforts. Liberal commission. **See page 38 for complete story.**

## FARMS FOR SALE

11 Acres, new house, barn, 3 acres orchard, organic farm. One-third down, $50 a month, no interest on balance. **A. L. WEBB, Box 319A, Rt. 3, Utica, Mich.**

## BUSINESS OPPORTUNITIES

**NEW PLANE PURCHASED TO SHIP FLOWERS TO NORTHERN MARKETS;** So even more home gardeners are needed to produce flowers in Melbourne Village—a planned community for productive homes and creative living. Happy hunting ground for organic gardeners, with rich black soil and variety of composting materials available; abundant artesian water; adequate drainage at all times; year round gardening possibilities. Expert counsel at hand when needed. Not in hurricane belt. Rated most healthful spot in western hemisphere. Write us now: **AMERICAN HOMESTEADING FOUNDATION, Box 696, Melbourne, Florida.**

## MISCELLANEOUS

**"HAPPY ACRES GUEST HOME."** Specializing in organically raised, home cooked food. Rates on request. Open year round. **THE HAZELWOODS, 71 Greylock St., Lee, Mass.**

**COLLECTOR** will buy accumulations of old letters. Lend stamps on envelopes. Write or send. **ALBERT BUTZER, 1504 Broadway, Detroit, Michigan.**

Cesspools, septic tanks and clogged drains can be corrected by applying "Sursolvent". These chemicals liquefy forgn of organic matter and remove particles in the subsoil which cause flooding and overflowing. No pumping required. Comes in 100 lb. steel drums. Write for descriptive literature. **ELECTRIC SEWER CLEANING CO., Allston, Mass.**

**AFRICA—SOUTH OF THE EQUATOR.** Enquiries as to Exports and Imports—or personal matters gladly answered by **MR. V. S. WELSFORD, P. O. Box 7858, Johannesburg, South Africa,** accredited Subscription Agent for Organic Gardening.

**The purpose of The Trading Post is to bring together the buyer and seller of organically-grown food products. If you wish to buy or sell organically-grown foods send advertising copy to Organic Gardening, Emmaus, Pa.**

## FOR SALE
## ORGANICALLY-GROWN FOOD PRODUCTS

We are sold out of many of our products but are still able to supply you with the following items:

| | | |
|---|---|---|
| Whole wheat or Rye | 6 lb. | $1.00 |
| Wheat or Rye (finely ground) | 5 lb. | 1.00 |
| Whole Edible Soybeans (Bausl) | 5 lb. | 1.00 |
| Soybeans (debittered and finely ground) | 4 lb. | 1.00 |
| Nu-Meal—a hot cereal of 7 grains | 4 lb. | 1.00 |
| Nu-Meal Krums (Ready to eat Nu-Meal) | 2 lb. | 1.00 |
| Whole Sunflower Seeds (Regular Grown) | 2 lb. | 1.00 |
| Sunflower Seeds (Shelled hulls removed) | 1 lb. | 1.25 |
| Shelled Sunflower Seed (cracked & toasted) | 1 lb. | 1.00 |
| Apple or Pear Juice (pure unboiled) | 1 gal. | 3.00 |

Sharing of postage is appreciated in distances to Florida and beyond the Mississippi. **NU-MEAL MILLS, Apple Creek, Ohio.**

**GRAPES,** grown organically. Make grapes your unusual and delightful gift. Shipped daily during August. Packed in 2-quart tills 8 to a crate. Price, $4.00 a crate plus postage. **ROSE CITY NURSERY, Maiden, N. C.**

## SOURCES OF SUPPLY WANTED FOR ORGANICALLY-GROWN FOOD PRODUCTS

**SOURCES FOR FOOD Raised By The Organic Method** are wanted by **Organic Gardening** readers. Many readers have discovered beneficial effects to their health from eating organically-raised foods. If you have such foods to sell . . vegetables, fruits, meats, jellies, canned goods, etc. , regardless of quantity . . it will pay you to advertise them for sale in these columns. Write Advertising Manager; **ORGANIC GARDENING, Emmaus, Pa.**

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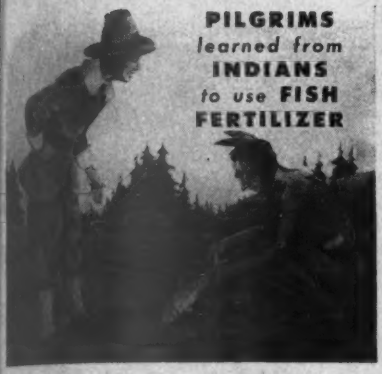

**PILGRIMS** *learned from* **INDIANS** *to use* **FISH FERTILIZER**

# "Sea-Going FISH the IDEAL FERTILIZER"

—says Editor J. I. Rodale

"A sea-going fish, unlike cattle, does not eat food raised with chemical fertilizers. It feeds in waters rich with minerals, prominent among which is the most valuable element, iodine." Science says Mr. Rodale is right. Analysis shows that these many essential minerals are not only present in "sea-going fish" — they are also "available" for plant use.

**Unless you got your garden plot directly from the Indians, SOMEBODY depleted its vital essentials before YOU took over. This deficiency is perpetuated in the compost you produce, and in the manure you get from farms which probably suffer from soil deficiency.**

***The SWIFT, SURE method to replace soil deficiencies is to add something you KNOW contains those missing soil elements***

## ATLAS *FERTILIZER EMULSION*

**COMPLETE contents of ATLAS FERTILIZER EMULSION**

1. Nitrogen
2. Phosphorus
3. Potassium
4. Calcium
5. Magnesium
6. Iodine
7. Chlorine
8. Boron
9. Copper
10. Iron
11. Manganese
12. Zinc
13. Sodium
14. Silicon
15. Aluminum
16. Strontium
17. Titanium

is a POWERFUL CONCENTRATE, made from the non-edible (richest in fertility) parts of sea-going fish. It is rich in natural "life factors" without which no plant or animal long survives — including the complete B-complex vitamin groups. It contains more plant food essentials and valuable trace minerals than any soil, compost, manure or other fertilizer.

ALL the elements in ATLAS FERTILIZER EMULSION are quickly available for plant growth — a fact of vital importance as no element can be used by any plant unless it is water-soluble. Thus ATLAS FERTILIZER EMULSION can enter the plant root-hairs directly.

ATLAS FERTILIZER EMULSION in your soil or compost, "starts a chain reaction" which multiplies its benefits. It strongly stimulates earthworm activity and reproduction — and multiplies the nitrogen-fixing soil bacteria which manufacture fertilizer for you.

ATLAS FERTILIZER EMULSION is 100% ORGANIC, plus a required minimum of preservative, which is more than neutralized by either the alkali in your "city water", or by a very small part of the lime you use in compost. Highly concentrated, it should be diluted one pint to 80 gallons of water for gardening — one pint to 20 gallons for compost. Apply with watering can or hose applicator.

**By mail only for introduction.**

***You will be delighted with the QUICK results — will KNOW you are replacing soil deficiencies.***

**For sale at garden supply stores.**

**ATLAS FERTILIZER EMULSION**
**1 Drumm St., San Francisco 11, Calif.**

**DEALERS—Write for Proposition.**

**ATLAS FERTILIZER EMULSION, 1 Drumm St., San Francisco 11, Calif.**

Please send your dealer's name & address.

Please send me your introductory bottle of ATLAS FERTILIZER EMULSION (pint makes 80 gals.) for which I enclose $1.00. ☐
Please send me additional information . . . . . ☐

We will ask him to have ATLAS F. E. in stock when you need more. PINTS - QUARTS GALS. - 5 GALS.

My name_____
Street or Route_____ City_____ State_____

***My garden supply dealer is—***

His name_____
His address_____ City_____ State_____

***FISH—America's First Fertilizer***

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MRS JAMES INGLIS
2301 HIGHLAND ROAD
ANN ARBOR MICH

# The Healthy Hunzas

*by*

**J. I. RODALE**

*author of Pay Dirt*

WHO are the Hunzas? Why are they so healthy and so happy? Explorers have long known that the Hunzas, tucked away in a fold of the mountains of Northern India, are an unusual race and the healthiest on earth.

Travellers have long been returning with fascinating accounts of the habits and customs of these buoyant, well-adjusted people. James Hilton knew of them, and based his best-selling LOST HORIZON on stories he had been told about the HUNZAS. The *Healthy Hunzas* really do live in Shangri-La, where there is little or no disease, delinquency or crime, where everyone is healthy and happy and lives to a ripe old age. Mr. Rodale believes that the reason for all this too-good-to-be-true way of life rests with the good earth of Hunza-Land itself. For the Hunzas till their mountainsides in accordance with Nature's Law of Return. Readers of ORGANIC GARDENING know, of course, its credo: healthy plants, healthy soil, healthy people. The HEALTHY HUNZAS is a travelbook like no other: a fascinating account of a fabulous people—and a lesson in soil conservation. Occasionally hilarious, often startling, its deadly seriousness and underlying purpose carry a stunning impact. Cloth, illustrated. $2.75.

# PAY DIRT

*by* **J. I. RODALE**

Editor of Organic Gardening

NOW in its sixth edition, PAY DIRT is still one of the most important books published in this country for years. Next to the Atom Bomb, nothing else in the world is so serious as Man's ravishment of the earth that sustains him and keeps him from starvation. Even more than the Atom Bomb, our top-soil could become beneficial to mankind if properly treated. PAY DIRT points the way to proper farming and gardening methods and is guaranteed to "give a case of the jitters to all back yard gardeners as well as . . . farmers who have been playing it the easy way by using chemical fertilizers. It will very well scare them back to the compost heap. It also proves that what you and I don't know about the art of composting . . . would fill . . . a book."—THE NEW YORKER. "—brings the all-important world problem of soil conservation into focus for the individual gardener."—THE NEW YORK HERALD TRIBUNE. "—an exciting book, both for the farmer and the gardener."—Richardson Wright, in HOUSE AND GARDEN. PAY DIRT is a manual for everyone who wants to adopt Organic Gardening methods. *SELLING BETTER THAN EVER* . . . Cloth. $3.00.

***Order your Autographed Copies of Both Books at no Extra Cost***

**ORGANIC GARDENING** **EMMAUS, PA.**